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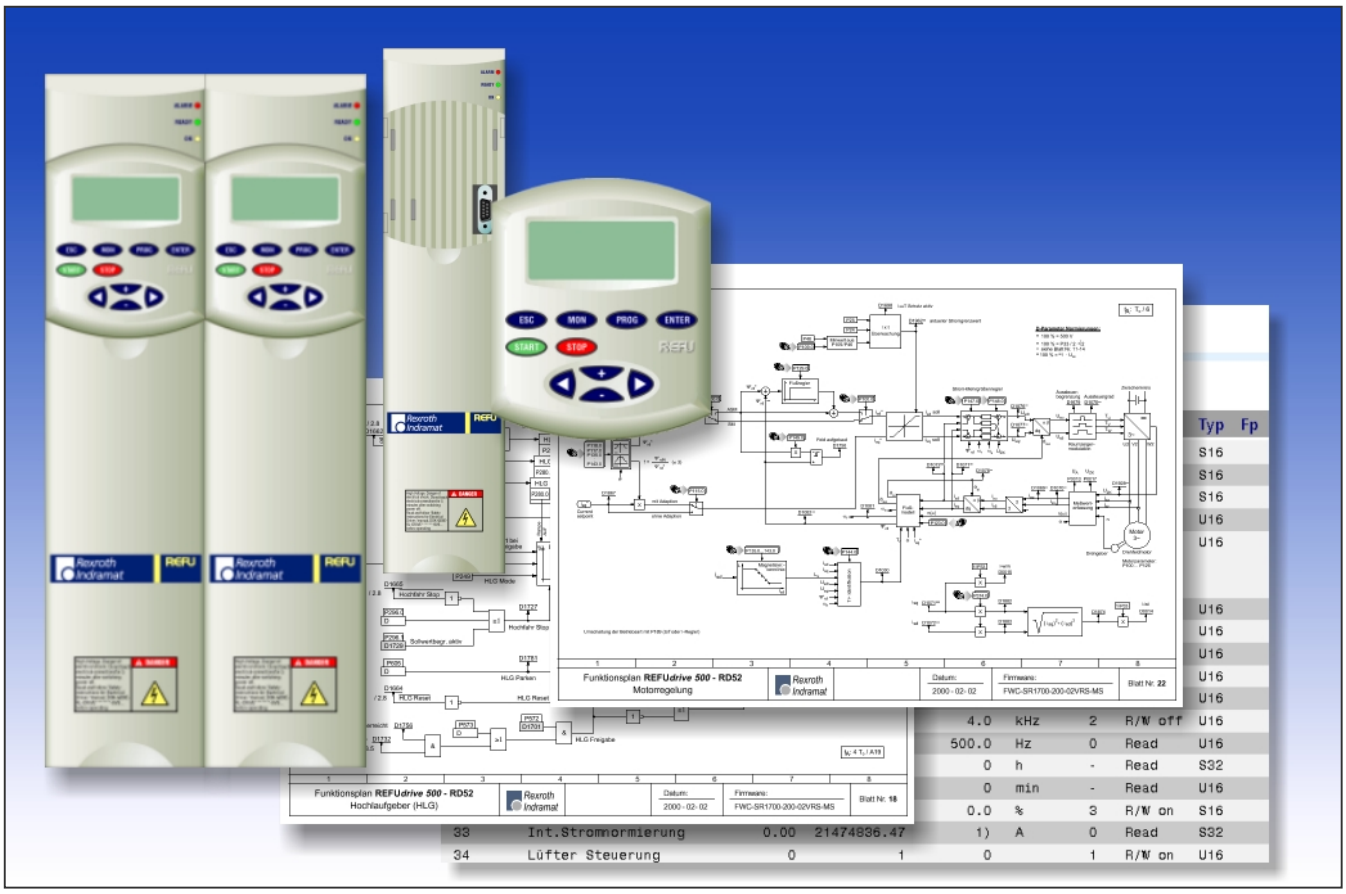

REFUdrive 500 RD52
Function diagrams and parameter list

Functional Description

DOK-RD500*-RD52*04VRS*-FK01-EN-P

Rexroth
Indramat

Title Function diagrams and parameter list

Type of Documentation Functional Description

Document Typecode DOK-RD500*-RD52*04VRS*-FK01-EN-P

Internal File Reference

- Document Number: 120-1950-B315-01/EN

Purpose of Documentation This documentation describes …

- the parameterization of the drive control devices based on function diagrams and parameter list.

Record of Revisions

Description	Release Date	Notes
DOK-RD500*-RD52*04VRS*-FK01-EN-P	02.2001	First edition

Published by Indramat Refu GmbH
Uracher Straße 91 • D-72555 Metzingen
Telephone 07123/969-0 • Fax 07123/969-260
http://www.indramat.de

Dept. Development E (jr)

Note This document has been printed on chlorine-free bleached paper.

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1 Parameterization

1.1 Parameterization

In the parameterization, the operator has the full functional scope of the firmware documented in the function charts and the parameter list. It is selected in the condition when supplied. Using the "numerical list", all parameters can then be selected and set using their parameter number.

1.2 Parameterization using the operator panel RZB

Fig. 1-1: Operating panel with graphics display (option)

Key functions when parameterizing

Key	Menu level	Parameterizing level
Esc	Return jump to the previous menu item	The modified value is rejected
Mon	Change into the monitor	
Prog	Change in the parameter-ization	The value is temporarily accepted. All of the values are only accepted after first pressing the "enter" key.
Enter	The selected menu item is accepted	The modified value is accepted
+	To the previous menu item	The value is increased
−	To the next menu item	The value is decreased
▶	Jump to the end of the list	Cursor position to the right
◀	Jump to the start of the list	Cursor position to the left

Fig. 1-2: Key functions of the operator panel when parameterizing

Fast parameterization using the key combinations

Key	Response
◀	The first selection text for text parameters is directly selected.
+ + −	When these keys are pressed together: – the complete parameter number is set to zero (numerical list). – the complete parameter value is set to zero (for numerical parameters). – the text selection is progressed in steps of 10 (practical e.g. for parameter P0875 with almost 100 selection texts). – the standard value is set.
▶	The last selection text for text parameters is directly selected.
◀ + ▶	When these keys are pressed together, the factory setting is set for the active value.
Mon + Prog	If these keys are pressed together, the system changes from the Mon. - or Prog area into a temporary actual value display. When the ESC key is pressed once, the display switches back to the selected menu. In order that the operator can make a differentiation between the normal operating display and the temporary actual value display, a flashing frame is used for the temporary actual value display.

Fig. 1-3: Key combinations

Fault messages when parameterizing

Fault message	Cause	Solution
Parameter can only be read	An attempt was made to change a display parameter.	
Parameter can only be changed when the inverter is inhibited	Inverter is operational.	Inhibit the inverter and then change the parameter.
Data conflict (general)	Some parameter settings are dependent on others. If a parameter value is changed and confirmed with Enter, data conflicts can arise.	
e.g. data conflict P0046 with P0109.00 Prog=temp.transfer	The current limit specified in P0109.00 is too high for this unit with the selected pulse frequency (P0026).	Temporarily accept the value of the first parameter change with Prog, after the second parameter change, confirm that both values should be saved with Enter.

Fig. 1-4: Fault messages when parameterizing

Structure of the PARAMETERIZING menu

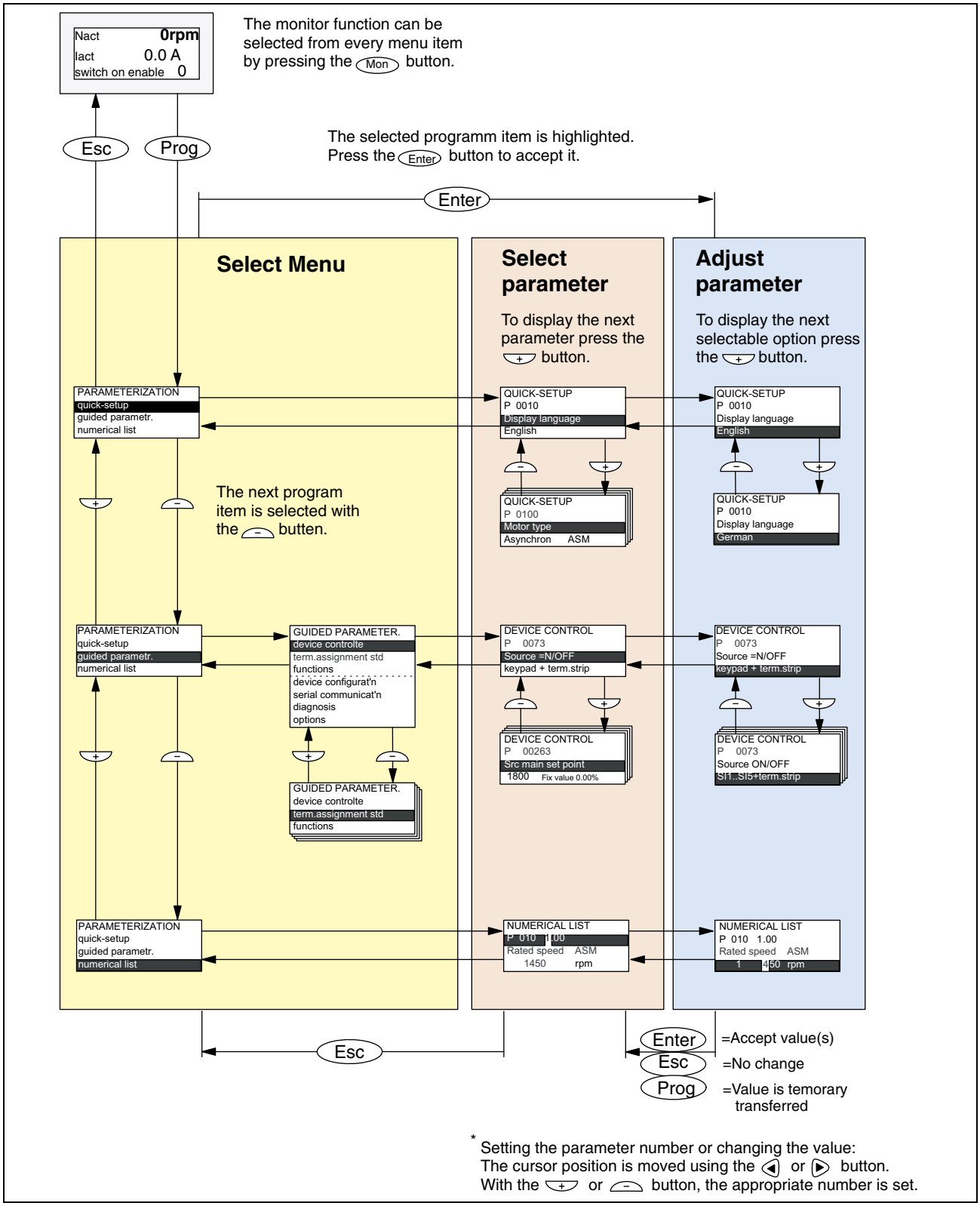

Fig. 1-5: Menu structure

2 Parameter list

2.1 Explanation of the table columns

This section contains the parameters and data of firmware FWC-SR1700-200-04VRS-Ms. The tables are used to numerically refer to parameters. This is the reason that they are numerically sorted.

No.	Ind	Parameter name	Min. value	Max. value	Std. val.	Unit	Pw	Prog	Type	Fp
1)	2)	3)	4)	4)	5)	6)	8)	9)	10)	11)
0050	[7]	Source, control word KL	0	2044	1701	D-Par 7)	2	R/W off	U16	02
0034		Fan control parameter value: 12)	0 0 = Automatic 1 = ON	1	0		1	R/W on	U16	
0202		Analog input offset	-199.99	199.99	0.00 13)	%	2	R/W on	S16	

1) No. Parameter number

2) Ind (max. Index) Various parameters have an index range. If, e.g. [4], is located in the column, then the parameter has the index range from 0...4, i.e. 5 Index levels.

3) Parameter name The parameter name which is also displayed in the operator panel. In many cases, the parameter function cannot be explained with just the name. The significance and function can be taken from the function charts.

4) Min. value - Max. value The selectable value range of the parameter. All of the values between these limits including "minimum value" and "maximum value" can be set and displayed with a resolution of the last position.

5) Std. value (Standard) The parameter value settings correspond to those when the equipment is first supplied. For parameters with index, the parameter value in the column "standard value" is valid for all index levels. For motor parameters, the standard depends on the output class of the drive converter or inverter.

6) Units (units) Hz, V, A, kW, RPM, °C, W, % etc.

7) D-par The "standard value" is the number of the currently connected D parameter. The "minimum value" and "maximum value" mark the range of D parameters, which can be connected to the "variable parameter source" (in the example, P0069, index 0 and 1).

8) Pw (Password)

- = No password required
1 = Password 1: Esc Mon Prog and confirm with Enter
2 = Password 2: Esc Mon Prog + and confirm with Enter
3 = Password 3: ▶ Esc Mon Prog and confirm with Enter

9) Prog.

Read = The parameter can only be read.

R/W = The parameter can be read and written into.

off = Programming is only possible when the unit is in the "ready condition".

on = Programming is also possible when the unit is in the "operating condition".

10) Type

U = unsigned

S = signed

Example: S16 = signed 16 bit = 15 data bits (bits 0 to 14) and a bit for the sign (bit15)

11) Fp

Cross-reference to the function chart.

12) Parameter value

Parameters to set functions. The selectable functions are listed below the line for the parameter. When parameterizing using the operator panel, the function is selected using the plain text display in the display. When parameterizing via the interface, the number of the required function must be transferred as parameter value

13) Decimal point

In the parameter tables, the "minimum value", "maximum value" and "standard value" are entered with a decimal point [.].

When parameterizing via the interface, only the pure numerical value (without decimal point) can be transferred as parameter value. The parameter value is appropriately interpreted by the firmware in the drive converter in order to obtain the correct decimal value, as specified in the tables. Also when reading parameter values, only the numerical value is transferred from the drive converter to the control computer. There, the parameter value must be interpreted corresponding to the data in the table.

Example: The ramp-up time (P0280.x) of the ramp-function generator should be set to 5.5 sec. This is displayed with a resolution to 3 decimal places => 5.500 s. The parameter value 5500 must be sent via the interface. In the drive converter, it is then interpreted with the decimal format #.###, which results in => 5.500 sec.

2.2 Parameterlist

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0000	[23]	Firmware FWC-	0	0	0		0	Read	U16	
		parameter value: 0 = SR1700-200-04V01-MS								
0001		Device ID	502	502	502		0	Read	U16	
0002		Firmware version	0	65535	2		0	Read	U16	
0003		Firmware modul	0	65535	4		0	Read	U16	
0004		Firmware revision	0	65535	1		0	Read	U16	
0005		Firmware	0	9	0		0	Read	U16	
		parameter value: 0 = RD52 standard 1 = RD52 A1 special V. 2 = RD52 A2 special V. 3 = RD52 A3 special V. 4 = RD52 A4 special V. : 9 = RD52 A9 tmp. special								
0006		Serial number	0	65535	0)		0	Read	U16	
0007		Converter number	0	65535	0)		0	Read	U16	
0008		EEPROM prog cycles	-1	100000	0		-	Read	S32	
0009		Enter Password	0	9999999	0		0	R/W on	S32	
0010		Display language	0	1	1		0	R/W on	U16	
		Parameter value: 0 = English 1 = German								
0013		O/P voltage Vout	0	32767	-	V	0	Read	S16	25
0014		O/P current Iout	-3276.8	3276.7	-	A	0	Read	S16	25
0015		O/P current Iactive	-3276.8	3276.7	-	A	0	Read	S16	25
0017		DC link voltage	0	1000	-	V	0	Read	U16	25
0018		Line voltage	0	65535	-	V	0	Read	U16	
0019		Converter type	0.0	6553.5	1)	kW	0	Read	U16	
0020		Power input	0	1	0)		0	Read	U16	
		Parameter value: 0 = DC Input 1 = AC Input								
0021		Rated mains voltage	0	65535	0)	V	0	Read	U16	
0022		Continuous output	0.0	6553.5	1)	kVA	0	Read	U16	
0023		Peak output long	0.0	6553.5	1)	kVA	0	Read	U16	
0024		Continuous current	0.0	6553.5	1)	A	0	Read	U16	25
0025		Peak current long	0.0	6553.5	1)	A	0	Read	U16	25
0026		Pulse frequency	2.0	12.0	4.0	kHz	2	R/W off	U16	
0027		Max. output . freq.	50.0	1500.0	1500.0	Hz	0	Read	U16	
0028		Operating hours	0	21474836	0	h	-	Read	S32	
0029		Operating minutes	0	59	0	min	-	Read	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0033		Int current norm	0.00	21474836.47	1)	A	0	Read	U32	25
0034		Fan control	0	2	0		1	R/W on	U16	
		Parameter value: 0 = automatic 1 = ON permanently 2 = ON if inverter on								
0035		Fan contr threshold	20	150	40	°C	1	R/W on	U16	
0036		Braking resistor	0	3	0		1	R/W on	U16	
		Parameter value: 0 = REFU standard 1 = disabled 2 = no protection 3 = external programabl								
0037	[2]	Display line 1,2,3	0	6	5		0	R/W on	U16	
		parameter value: 0 = status 1 = N actual 2 = I active 3 = I actual 4 = U actual 5 = DC-link voltage 6 = f actual								

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0039		Alarm	0	65	0		0	Read	U16	

parameter value

0 = No fault
1 = External 0
:
3 = DC-link volt.high
4 = DC-link volt.low
:
7 = Device overtemp.
8 = Brake resistor
9 = Main contacter
10 = Pre-charging
11 = New EEPROM
:
13 = Power section
14 = Inverter
15 = Power supply
16 = Internal DSP comm.
17 = Overspeed
18 = Ground fault
19 = EEPROM DATA
20 = Internal DSP ackn.
21 = Internal WS comm.
22 = NTC powersection
23 = encoder
24 = SI1 timeout
25 = SI2 function
26 = SI2 timeout
27 = Analog input I<4mA
28 = Motor overtemperat.
29 = Parameter calculatn
30 = ? SR-Release ?
31 = BR overload
:
35 = Motor overload
36 = SI3 timeout
:
38 = Configuration mode
39 = start protection On
40 = Switched pwr supply
41 = SR <==> WS new
42 = New device startup!
43 = Option1 <=> option2
44 = SI4 function
45 = SI4 timeout
46 = SI5 timeout
47 = start protection On
48 = module overtemp.
49 = DC-link asymmetry
50 = Phase V
51 = Phase W
52 = External 1
53 = External 2
54 = External 3
55 = External 4
56 = External 5
57 = External 6
58 = External 7
59 = SI6 timeout
60 = SynchroLink timeout
:
63 = Output current EN81
64 = DC link discharge
:

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0040	[9]	Fault memory	0	65	0		-	Read	U16	
		parameter value: 0 = No fault 1 = External 0 : 3 = DC-link volt.high 4 = DC-link volt.low : 7 = Device overtemp. 8 = Brake resistor 9 = Main contacter 10 = Pre-charging 11 = New EEPROM : 13 = Power section 14 = Inverter 15 = Power supply 16 = Internal DSP comm. 17 = Overspeed 18 = Ground fault 19 = EEPROM DATA 20 = Internal DSP ackn. 21 = Internal WS comm. 22 = NTC powersection 23 = encoder 24 = SI1 timeout 25 = SI2 function 26 = SI2 timeout 27 = Analog input I<4mA 28 = Motor overtemperat. 29 = Parameter calculatn 30 = ? SR-Release ? 31 = BR overload : 35 = Motor overload 36 = SI3 timeout : 38 = Configuration mode 39 = start protection On 40 = Switched pwr supply 41 = SR <==> WS new 42 = New device startup! 43 = Option1 <=> option2 44 = SI4 function 45 = SI4 timeout 46 = SI5 timeout 47 = start protection On 48 = module overtemp. 49 = DC-link asymmetry 50 = Phase V 51 = Phase W 52 = External 1 53 = External 2 54 = External 3 55 = External 4 56 = External 5 57 = External 6 58 = External 7 59 = SI6 timeout 60 = SynchroLink timeout : 63 = Output current EN81 64 = DC link discharge :								
0041	[9]	Fault time h	0	65535	0	h	-	Read	U16	
0042	[10]	Fault time min	0	159	0	min	-	Read	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0043		Inhibit operation	0	2	1		2	R/W on	S16	53
		parameter value:	0 = brake mode 1 = inverter off 2 = brake down to N_min							
0044		Inhibit drive	0	2	0		2	R/W on	S16	53
		parameter value:	0 = brake mode 1 = inverter off 2 = brake down to N_min							
0046		Peak current short	0.0	6553.5	12.0	A	0	Read	U16	25
0048	[7]	Src fault external	0	2044	1700	D-Par	2	R/W off	U16	5
0049		Src warning externl	0	2044	1700	D-Par	2	R/W off	U16	5
0050	[7]	Src. ctrol. word KL	0	2044	1700	D-Par	2	R/W on	U16	2
0060		Special quit	0	1	0		2	R/W off	U16	
0061	[19]	Param.No. faultlist	0.00	9999.99	0.00		0	Read	U32	
0062	[19]	Par.value faultlist	0	999999	0		0	Read	S32	
0067		Invert RFG s/p	0	2044	1700	D-Par	2	R/W off	U16	20
0070		Parameter set 0/1	0	2044	1700	D-Par	2	R/W off	U16	5
0071		Load default values	0	2	0		0	R/W off	U16	
		parameter value:	0 = no action : 2 = free standardvalues							
0072		Source parameter	0	5	0		2	R/W off	U16	
		parameter value:	0 = keypad, PC(RS232) 1 = bus SI1 2 = bus SI2 3 = bus SI4 4 = all busses SIx 5 = bus SI6							
0073		Source ON/OFF	0	3	2		2	R/W off	U16	2
		parameter value:	0 = keypad + term.strip 1 = SI1..SI5+term.strip 2 = terminal strip 3 = PC(RS232)+term.str.							
0074		Src control word 1	0	2044	1900	D-Par	2	R/W off	U16	2
0075		Src control word 2	0	2044	1800	D-Par	2	R/W off	U16	4
0076	[15]	Src stat.word 1 bit	0	2044	1700	D-Par	2	R/W off	U16	3
0077		Src brakeChopper On	0	2044	1700	D-Par	3	R/W off	U16	
0078		switch DC-threshold	0	2044	1700	D-Par	3	R/W off	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0079		thresh. BW-warning	0	100	80	%	2	R/W off	U16	
0080		src. main-cont. off	0	2044	1700	D-Par	3	R/W off	U16	
0084	[15]	Src stat.word 2 bit	0	2044	1700	D-Par	2	R/W off	U16	4
0086		Heatsink temp diff	0	40	5	¦	1	R/W on	S16	30
0089		Source AND-gate	0	2044	1701	D-Par	2	R/W off	U16	33
0090		Source OR-gate	0	2044	1746	D-Par	2	R/W off	U16	33
0092		Switch off delay	0.00	600.00	0.00	sec	2	R/W on	U16	53
0093		Fault quit delay	0	20	1	sec	2	R/W on	U16	
0094		DC link min. value	0	P 95	450	V	3	R/W off	U16	
0095		DC link max. value	P 94	2500	700	V	3	R/W off	U16	
0096		Precharge- DC min	0	250	10	V	3	R/W off	U16	
0097	[1]	DCmax - BR ON	0	1000	40	V	3	R/W off	U16	
0098	[1]	DCmax - BR OFF	0	1000	45	V	3	R/W off	U16	
0100	[1]	Motor type	0	1	0		2	R/W off	U16	
		parameter value:	0 = Asynchron ASM 1 = Synchron SM							
0101	[1]	Rated speed ASM	100	90000	2)	1/min	2	R/W off	U32	
0102	[1]	Rated frequencyASM	10.0	1500.0	2)	Hz	2	R/W off	U16	
0103	[1]	Rated current ASM	0.1	3000.0	2)	A	2	R/W off	U16	
0104	[1]	Rated voltage ASM	10	550	2)	V	2	R/W off	U16	
0106	[1]	Power factor ASM	0.50	0.98	2)		2	R/W off	U16	
0107	[1]	Pole number SM	2	64	2)		2	R/W off	U16	
0108	[1]	Rated torque SM	0.1	500000.0	2)	Nm	2	R/W off	U32	
0109	[1]	Max. motor current	0.0	P 33	2)	A	2	R/W off	U16	25
0110	[1]	Stator resistor SM	0.001	10.000	2)	Ohm	2	R/W off	U16	25
0111	[1]	Inductance LD SM	0.05	650.00	2)	mH	2	R/W off	U16	25
0112	[1]	Rated current SM	0.1	3000.0	2)	A	2	R/W off	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0113	[1]	Rated speed SM	100	90000	2)	1/min	2	R/W off	U32	
0114	[1]	Pole pair number	1	64	2)		0	Read	U16	
0115	[1]	speedloop gain adpt	0	1	1		3	R/W off	U16	25
		parameter value:	0 = without 1 = with							
0117	[1]	Rated Isd ASM	0.0	P 25	05. Jun	A	2	R/W off	U16	25
0118	[1]	CornerFrequency ASM	10.0	1500.0	104.0	Hz	2	R/W off	U16	25
0119	[1]	Rated power ASM	0.0	6553.5	2.0	kW	2	R/W off	U16	
0120	[1]	Stator resistor ASM	0.001	65.535	0.628	Ohm	3	R/W off	U16	25
0121	[1]	Leakage factor ASM	0.0001	10.000	0.3341		3	R/W off	U16	25
0122	[1]	Main-inductance ASM	0.000	3.000.000	32.090	mH	3	R/W off	U32	25
0123	[1]	Rotor-timeconst ASM	10	3000	100	ms	3	R/W off	U16	25
0125	[1]	Long.inductance SM	0.05	655.35	10.00	mH	3	R/W off	U16	
0126	[1]	Transinductance SM	0.05	655.35	Okt 24	mH	3	R/W off	U16	
0127	[1]	Rated voltage SM	10	1000	200	V	2	R/W off	U16	
0128	[1]	Flux adaption ASM	0	200	50	%	3	R/W off	U16	25
0129	[1]	Fluxcontr.gain ASM	0	200	50	%	3	R/W off	U16	25
0130	[1]	Encoder selection	0	5	1		2	R/W off	U16	
		parameter value:	0 = Resolver 1 = Incremental Encoder 2 = ERN Encoder 3 = sine/cosine Encoder 4 = no speed sensor 5 = external via P145							
0131	[1]	Resolver pole-no	2	100	2		2	R/W off	U16	13
0132	[1]	Encoder increments	64	10000	1024		2	R/W off	U16	14 15 16
0133	[1]	sensor delta-phi	-180	180	0	¦	3	R/W off	S16	13 14 15 16 17 18
0134	[1]	encoder emulation	0	1	0		2	R/W off	U16	
		parameter value:	0 = of encoder SR17002 1 = of encoder GB21082							

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0135	[1]	Ls-factor @ 0.1 In	0.010	3.000	1.000		3	R/W on	U16	25
0136	[1]	Ls-factor @ 0.2 In	0.010	3.000	1.000		3	R/W on	U16	25
0137	[1]	Ls-factor @ 0.3 In	0.010	3.000	1.000		3	R/W on	U16	25
0138	[1]	Ls-factor @ 0.5 In	0.010	3.000	1.000		3	R/W on	U16	25
0139	[1]	Ls-factor @ 0.6 In	0.010	3.000	1.000		3	R/W on	U16	25
0140	[1]	Ls-factor @ 0.7 In	0.010	3.000	1.000		3	R/W on	U16	25
0141	[1]	Ls-factor @ 0.8 In	0.010	3.000	1.000		3	R/W on	U16	25
0142	[1]	Ls-factor @ 0.9 In	0.010	3.000	1.000		3	R/W on	U16	25
0143	[1]	Ls-factor @ 1.0 In	0.010	3.000	1.000		3	R/W on	U16	25
0144	[1]	TRotor ident gain	0.00	199.00	10.00	%	2	R/W off	U16	25
0145	[1]	Src encoder extern	0	2044	1800	D-Par	2	R/W off	U16	18
0146		Trigger encoderAdj.	0	2044	1700	D-Par	2	R/W off	U16	
0147	[1]	I-control dynamic	0	2	1		2	R/W off	U16	25
		parameter value:	0 = standard 1 = high 2 = very high							
0148	[1]	I-control gain	0	100	60	%	2	R/W off	U16	25
0149	[1]	Flux level reached	10	90	75	%	3	R/W off	U16	25
0150		speed encoderAdjust	-120	120	30	1/min	2	R/W off	S16	
0151		current encoderAdj.	1	100	50	%	2	R/W off	U16	
0153	[1]	Mode PWM-limiter	0	1	1		2	R/W off	U16	
		parameter value:	0 = circle 1 = hexagon							
0155	[3]	MFB source 0	0	2044	1800	D-Par	2	R/W off	U16	39
0156	[3]	MFB source 1	0	2044	1800	D-Par	2	R/W off	U16	39
0157	[3]	MFB source 2	0	2044	1800	D-Par	2	R/W off	U16	39

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0158	[3]	MFB function 1	0	7	0		2	R/W off	U16	39
		parameter value:	0 = addition 1 = subtraction 2 = multiply 3 = divide 4 = minimum of all i/p 5 = maximum of all i/p 6 = processData switch 7 = multiply and square							
0159	[3]	MFB function 2	0	2	0		2	R/W off	U16	39
		parameter value:	0 = direct 1 = absolute value 2 = inverting							
0160		S/P integrator up	0	2044	1700	D-Par	2	R/W on	U16	41
0161		S/P integrator down	0	2044	1700	D-Par	2	R/W on	U16	41
0162		S/P int. pos.limit	P 163	190.00	100.00	%	1	R/W on	S16	41
0163		S/P int. neg.limit	-190.00	P 162	0.00	%	1	R/W on	S16	41
0164		S/P integratr speed	1	100	5	%	1	R/W on	U16	41
0165		Src reset s/p int.	0	2044	1700	D-Par	2	R/W on	U16	41
0166		Src free-ch pos.i/p	0	2044	1800	D-Par	2	R/W off	U16	40
0167		Src free-ch neg.i/p	0	2044	1800	D-Par	2	R/W off	U16	40
0168	[9]	Free-char. x-values	-199.99	199.99	0.00	%	1	R/W on	S16	40
0169	[9]	Free-char. y-values	-199.99	199.99	0.00	%	1	R/W on	S16	40
0170		Src normalize F-C	0	2044	1800	D-Par	2	R/W off	U16	40
0171		Select normalize FC	0	1	1		2	R/W off	U16	40
		parameter value:	0 = variable source 1 = fixvalue							
0172		Fixval normalize FC	-199.99	199.99	100.00	%	1	R/W on	S16	40
0173		DR Teach in; upper	0	2044	1700	D-Par	2	R/W on	U16	32
0174		DR Teach in: lower	0	2044	1700	D-Par	2	R/W on	U16	32
0175		Dancing roller norm	-180.00	180.00	10.00	%	1	R/W on	S16	32
0176		Dancing roller offs	-100.00	100.00	0.00	%	1	R/W on	S16	32
0177		Src Dancing roller	0	2044	1800	D-Par	2	R/W off	U16	32

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0181	[1]	V/f characterist.Fa	0.0	1500.0	2)	Hz	2	R/W on	U16	26
0182	[1]	V/f characterist.Fb	0.0	1500.0	2)	Hz	2	R/W on	U16	26
0183	[1]	V/f characterist.Fc	0.0	1500.0	2)	Hz	2	R/W on	U16	26
0184	[1]	V/f characterist.Fd	0.0	1500.0	2)	Hz	2	R/W on	U16	26
0185	[1]	V/f characterist.Va	0	550	2)	V	2	R/W on	U16	26
0186	[1]	V/f characterist.Vb	0	550	2)	V	2	R/W on	U16	26
0187	[1]	V/f characterist.Vc	0	550	2)	V	2	R/W on	U16	26
0188	[1]	V/f characterist.Vd	0	550	2)	V	2	R/W on	U16	26
0189		operating mode	0	3	0		3	R/W off	U16	
		parameter value:	0 = cl. loop curr. Ctrl 1 = op.loop voltage ctr 2 = MotorIdentification 3 = Encoder optimize							
0200		Analog input1 norm.	0.00	199.99	100.00	%	2	R/W on	S16	8
0201		Analog input1 mode	0	3	0		2	R/W on	U16	8
		parameter value:	0 = -10V .. +10V 1 = +4 .. +20mA 2 = 0 .. +20mA 3 = +2V .. +10V							
0202		Analog input1 offs.	-199.99	199.99	0.00	%	2	R/W on	S16	8
0203		Analog input1 sign	0	4	0		2	R/W on	U16	8
		parameter value:	0 = direct 1 = absolute value 2 = inverted 3 = abs. value inverted 4 = limit on pos. Value							
0204		Analog input1 filtr	0	10000	0	ms	2	R/W on	U16	8
0205		Input-block 2 norm.	0.00	199.99	100.00	%	2	R/W on	S16	9
0206		Input-block 2 offs.	-199.99	199.99	0.00	%	2	R/W on	S16	9
0207		Input-block 2 sign	0	3	0		2	R/W on	U16	9
		parameter value:	0 = direct 1 = absolute value 2 = inverted 3 = abs. value inverted							
0208		Input-block 2 filtr	0	10000	0	ms	2	R/W on	U16	9

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0209		Input-block 3 norm.	0.00	199.99	100.00	%	2	R/W on	S16	9
0210		Input-block 3 offs.	-199.99	199.99	0.00	%	2	R/W on	S16	9
0211		Input-block 3 sign	0	3	0		2	R/W on	U16	9
		parameter value:	0 = direct 1 = absolute value 2 = inverted 3 = abs. value inverted							
0212		Input-block 3 filtr	0	10000	0	ms	2	R/W on	U16	9
0213		Input-block 4 norm.	0.00	199.99	100.00	%	2	R/W on	S16	9
0214		Input-block 4 offs.	-199.99	199.99	0.00	%	2	R/W on	S16	9
0215		Input-block 4 sign	0	3	0		2	R/W on	U16	9
		parameter value:	0 = direct 1 = absolute value 2 = inverted 3 = abs. value inverted							
0216		Input-block 4 filtr	0	10000	0	ms	2	R/W on	U16	9
0217		Source i/p block 2	0	2044	1800	D-Par	2	R/W off	U16	9
0218		Source i/p block 3	0	2044	1800	D-Par	2	R/W off	U16	9
0219		Source i/p block 4	0	2044	1851	D-Par	2	R/W off	U16	9
0220	[1]	Src PT1 filter	0	2044	1800	D-Par	2	R/W off	U16	38
0221	[1]	PT1 filt.timeconst.	0	5000	0	ms	1	R/W on	U16	38
0222		Source limiter 1	0	2044	1800	D-Par	2	R/W off	U16	38
0223		Positive limit 1	P 224	199.99	100.00	%	1	R/W on	S16	38
0224		Negative limit 1	-199.99	P 223	-100.00	%	1	R/W on	S16	38
0225		Source P-Modul	0	2044	1800	D-Par	2	R/W off	U16	38
0226		Gain P-Modul	0.000	10.000	1.000		1	R/W on	S16	38
0227		Offset P-Modul	-199.99	199.99	0.00	%	1	R/W on	S16	38
0228	[1]	Src1 ch-over switch	0	2044	1800	D-Par	2	R/W off	U16	38
0229	[1]	Src2 ch-over switch	0	2044	1800	D-Par	2	R/W off	U16	38
0230	[1]	Src switch function	0	2044	1700	D-Par	2	R/W off	U16	38

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0231		Src TC normalizat'n	0	2044	1800	D-Par	2	R/W off	U16	35
0232		Select TC normalize	0	1	0		2	R/W off	U16	35
		parameter value:	0 = variable source 1 = fixvalue							
0233		Fixvalue TC norm.	-199.99	199.99	0.00	%	1	R/W on	S16	35
0234		Src TC actual value	0	2044	1800	D-Par	2	R/W off	U16	35
0235		DT1 Modul T1	0	5000	0	ms	1	R/W on	U16	35
0236		DT1 Modul gain	0.000	16.000	1.000		1	R/W on	U16	35
0237		Src TC act.val.sign	0	2044	1700	D-Par	2	R/W off	U16	35
0238		Src TC set point	0	2044	1800	D-Par	2	R/W off	U16	35
0239		Select TC set point	0	1	0		2	R/W off	U16	35
		parameter value:	0 = variable source 1 = fixvalue							
0240		Fixvalue TC s/p	-199.99	199.99	0.00	%	1	R/W on	S16	35
0241		Src TC s/p sign	0	2044	1700	D-Par	2	R/W off	U16	35
0242		TC gain	0.000	16.000	1.000		1	R/W on	U16	35
0243		TC integral time	0	10000	10	ms	1	R/W on	U16	35
0244		TC droop	0.00	100.00	10.00	%	1	R/W on	S16	35
0245		Src TC enable	0	2044	1700	D-Par	2	R/W off	U16	35
0246		Src TC droop enable	0	2044	1700	D-Par	2	R/W off	U16	35
0247		TC positive limit	0.00	190.00	100.00	%	1	R/W on	S16	35
0248		TC negative limit	-190.00	0.00	-100.00	%	1	R/W on	S16	35
0249		RFG up/down-mode	0	1	0		2	R/W off	U16	21
		parameter value:	0 = torque-direction 1 = speed-direction							
0250		Src add. s/p 1	0	2044	1800	D-Par	2	R/W off	U16	22
0251		Select add. s/p 1	0	1	0		2	R/W off	U16	22
		parameter value:	0 = variable source 1 = fixvalue							
0252		Fixvalue add. s/p1	-199.99	199.99	0.00	%	1	R/W on	S16	22

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0253		Src factor add.s/p2	0	2044	1800	D-Par	2	R/W off	U16	22
0254		Select fact.ad.s/p2	0	1	0		2	R/W off	U16	22
		parameter value:	0 = variable source 1 = fixvalue							
0255		Fixval.fact.ad.s/p2	-199.99	199.99	0.00	%	1	R/W on	S16	22
0256		Src add. s/p 3	0	2044	1800	D-Par	2	R/W off	U16	22
0257		Select add. s/p 3	0	1	0		2	R/W off	U16	22
		parameter value:	0 = variable source 1 = fixvalue							
0258		Fixvalue add. s/p 3	-199.99	199.99	0.00	%	1	R/W on	S16	22
0259		Src add. s/p 2	0	2044	1825	D-Par	2	R/W off	U16	22
0260		Fixvalue add. s/p2	-199.99	199.99	0.00	%	1	R/W on	S16	22
0261		Src select add.s/p2	0	2044	1701	D-Par	2	R/W off	U16	22
0262		Src RFG-initial val	0	2044	1851	D-Par	2	R/W off	U16	21
0263		Src main set point	0	2044	1801	D-Par	2	R/W off	U16	20
0264		Select main setp'nt	0	2044	1700	D-Par	2	R/W off	U16	20
0265		Fixvalue main s/p	-199.99	199.99	0.00	%	1	R/W on	S16	20
0266		S/P base speed	-199.99	199.99	1.00	%	1	R/W on	S16	20
0267		S/P inch speed 1	-199.99	199.99	2.00	%	1	R/W on	S16	20
0268		S/P inch speed 2	-199.99	199.99	3.00	%	1	R/W on	S16	20
0269		Src inch speed 3	0	2044	1800	D-Par	2	R/W off	U16	20
0270		Src enable inching3	0	2044	1700	D-Par	2	R/W off	U16	20
0271		Src RFG param.set 2	0	2044	1700	D-Par	2	R/W off	U16	21
0272		Src base speed	0	2044	1700	D-Par	2	R/W off	U16	20
0273		Src inch speed 1	0	2044	1700	D-Par	2	R/W off	U16	20
0274		Src inch speed 2	0	2044	1700	D-Par	2	R/W off	U16	20
0275		Src setpoint RFG	0	2044	1880	D-Par	2	R/W off	U16	20
0277		Src enable SC	0	2044	1701	D-Par	2	R/W off	U16	23

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0278		Src SC integral OFF	0	2044	1700	D-Par	2	R/W off	U16	23
0279		Src SC droop enable	0	2044	1700	D-Par	2	R/W off	U16	23
0280	[1]	Ramp up time	0.000	3.200.000	1.000	sec	1	R/W on	U32	21
0281	[1]	Ramp down time	0.000	3.200.000	1.000	sec	1	R/W on	U32	21
0282	[1]	Rounding ramp up	0.000	800.000	0.000	sec	1	R/W on	U32	21
0283	[1]	Rounding ramp down	0.000	800.000	0.000	sec	1	R/W on	U32	21
0288		Ramp up fast stop	0.000	3.200.000	0.000	sec	1	R/W on	U32	21
0289		Ramp down fast stop	0.000	3.200.000	0.000	sec	1	R/W on	U32	21
0290		Rounding up f.stp	0.000	800.000	0.000	sec	1	R/W on	U32	21
0291		Rounding down f.stp	0.000	800.000	0.000	sec	1	R/W on	U32	21
0292		RFG override level	0.00	199.99	0.00	%	1	R/W on	S16	21
0293		Normalize dv/dt	0.00	655.35	100.00	%	1	R/W on	U16	21
0294		Src RFG override	0	2044	1700	D-Par	2	R/W off	U16	21
0295		Src fixval. T-limit	0	2044	1700	D-Par	2	R/W off	U16	24
0296	[1]	Src RFG stop	0	2044	1700	D-Par	2	R/W off	U16	21
0297	[1]	Analog input window	0.00	20.00	0.00	%	1	R/W on	S16	8
0298		Src SC param.set 2	0	2044	1700	D-Par	2	R/W off	U16	23
0299		Src sign revers.AI1	0	2044	1700	D-Par	2	R/W off	U16	8
0300		Src add. s/p 4	0	2044	1800	D-Par	2	R/W off	U16	22
0301		Select add. s/p 4	0	2044	1701	D-Par	2	R/W off	U16	22
0302		Fixvalue add. s/p 4	-199.99	199.99	0.00	%	1	R/W on	S16	22
0303		Speed s/p pos.limit	0.00	190.00	100.00	%	2	R/W on	S16	22
0304		Speed s/p neg.limit	-190.00	0.00	-100.00	%	2	R/W on	S16	22
0305		Src 305 set point	0	2044	1834	D-Par	2	R/W off	U16	22
0306		Source notch-filter	0	2044	1800	D-Par	2	R/W off	U16	19
0307		Source reversal	0	2044	1700	D-Par	2	R/W off	U16	23

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0308		Notch filter f	0.0	1000.0	0.0	Hz	1	R/W on	U16	19
0309		Notch filter Q	0.0	10.0	1.0		1	R/W on	U16	19
0310		Speed signal filter	0.0	100.0	2.0	ms	1	R/W on	U16	23
0311		Source limiter 2	0	2044	1800	D-Par	2	R/W off	U16	36
0314		Source 1 mul-div	0	2044	1800	D-Par	2	R/W off	U16	36
0315		Factor mul-div	-199.99	199.99	100.00	%	1	R/W on	S16	36
0316		Source 2 mul-div	0	2044	1800	D-Par	2	R/W off	U16	36
0317		Source 1 Multipl. 1	0	2044	1800	D-Par	2	R/W off	U16	36
0318		Source 2 Multipl. 1	0	2044	1800	D-Par	2	R/W off	U16	36
0319		SC initial-integral	-100.00	100.00	0.00	%	1	R/W on	S16	23
0320		Source AuxContr s/p	0	2044	1800	D-Par	2	R/W off	U16	34
0321		Source AuxContr f/b	0	2044	1800	D-Par	2	R/W off	U16	34
0322		AuxContr Gain	0.0	128.0	1.0		1	R/W on	U16	34
0323		AuxContr integral	0	5000	0	ms	1	R/W on	U16	34
0324		Src AuxContr enable	0	2044	1700	D-Par	2	R/W off	U16	34
0325		AuxContr positv lim	0.00	190.00	100.00	%	1	R/W on	S16	34
0326		AuxContr negatv lim	-190.00	0.00	-100.00	%	1	R/W on	S16	34
0327		Src 1 add. Torque	0	2044	1842	D-Par	2	R/W off	U16	31
0328		Src 2 add. Torque	0	2044	1800	D-Par	2	R/W off	U16	31
0329		Src 3 add. Torque	0	2044	1844	D-Par	2	R/W off	U16	31
0330		Source adaptive G	0	2044	1800	D-Par	2	R/W off	U16	23
0331		Select adaptive G	0	1	1		2	R/W off	U16	23
		parameter value:	0 = variable source 1 = fixvalue							
0332		Fixvalue adaptive G	-199.99	199.99	0.00	%	1	R/W on	S16	23
0333		Norm. adaptive Gain	-10.000	10.000	0.000		1	R/W on	S16	23
0334		Addvalue adaptive G	-1.000	1.000	1.000		1	R/W on	S16	23

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0335		Speed controller G1	0.0	128.0	5.0		1	R/W on	U16	23
0336		Speed controller T1	0	5000	10	ms	1	R/W on	U16	23
0337		Speed controller G2	0.0	128.0	5.0		1	R/W on	U16	23
0338		Speed controller T2	0	5000	10	ms	1	R/W on	U16	23
0339		Source speed f/b	0	2044	1873	D-Par	2	R/W off	U16	23
0340		Multiplier droop	-25.00	25.00	0.00	%	1	R/W on	S16	23
0341		Source w2-Input	0	2044	1800	D-Par	2	R/W off	U16	23
0342		Speed s/p filter	0.0	100.0	0.0	ms	1	R/W on	U16	23
0343		SC freeze integral	0	2	1		2	R/W on	U16	23
0344		Src frict'n compens	0	2044	1851	D-Par	2	R/W off	U16	31
0345	[9]	Frict.: speed value	0.00	199.99	1.00	%	1	R/W on	S16	31
0346	[9]	Frict.:torque value	-199.99	199.99	0.00	%	1	R/W on	S16	31
0347		Friction normalize	0.00	199.99	100.00	%	1	R/W on	S16	31
0348		Source J-external	0	2044	1800	D-Par	2	R/W off	U16	31
0349		Normalize J-extern	0.00	199.99	100.00	%	1	R/W on	S16	31
0350		Source J-ext/-fix	0	2044	1700	D-Par	2	R/W off	U16	31
0351		Fixed value J	0.00	199.99	0.00	%	1	R/W on	S16	31
0352		Source J-extrnal ON	0	2044	1701	D-Par	2	R/W off	U16	31
0353		Source dv/dt	0	2044	1800	D-Par	2	R/W off	U16	31
0354		Source dead band	0	2044	1800	D-Par	2	R/W off	U16	31
0355		Dead band, width B	0.00	199.99	5.00	%	1	R/W on	S16	31
0356		Dead band gain	0.000	10.000	1.000		1	R/W on	S16	31
0357		positive limit 3	P 358	199.99	100.00	%	1	R/W on	S16	31
0358		negative limit 3	-199.99	P 357	-100.00	%	1	R/W on	S16	31
0359		Enable frict'n test	0	2044	1700	D-Par	2	R/W off	U16	31
0360		Src add.Torque s/p	0	2044	1800	D-Par	2	R/W off	U16	24

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0361		Select add.T s/p	0	1	1		2	R/W off	U16	24
		parameter value:	0 = variable source 1 = fixvalue							
0362		Fixvalue add.T s/p	-199.99	199.99	0.00	%	1	R/W on	S16	24
0363		Normalize add.T s/p	-100.00	100.00	100.00	%	1	R/W on	S16	24
0364		Filter add. T s/p	0	5000	0	ms	1	R/W on	U16	24
0365		Source T limit 1	0	2044	1800	D-Par	2	R/W off	U16	24
0366		Select T limit 1	0	1	1		2	R/W off	U16	24
		parameter value:	0 = variable source 1 = fixvalue							
0367	[1]	Fixvalue T limit 1	-199.99	199.99	100.00	%	1	R/W on	S16	24
0368		Source T limit 2	0	2044	1800	D-Par	2	R/W off	U16	24
0369		Select T limit 2	0	1	1		2	R/W off	U16	24
		parameter value:	0 = variable source 1 = fixvalue							
0370	[1]	Fixvalue T limit 2	-199.99	199.99	-100.00	%	1	R/W on	S16	24
0371		Invert T limit 2	0	1	0		2	R/W off	U16	24
		parameter value:	0 = direct 1 = inverted							
0372	[1]	Fast stop T limit 1	-199.99	199.99	125.00	%	1	R/W on	S16	24
0373	[1]	Fast stop T limit 2	-199.99	199.99	-125.00	%	1	R/W on	S16	24
0374	[1]	Normalize current	0.0	P 33	P 24	A	2	R/W off	U16	24
0375		Compens. motortemp.	0.00	20.00	0.00	%	2	R/W on	U16	24
0376		Source Torque s/p	0	2044	1854	D-Par	1	R/W off	U16	24
0377		Source inv.T-limit	0	2044	1700	D-Par	2	R/W off	U16	24
0380		Source T add. s/p 1	0	2044	1858	D-Par	2	R/W off	U16	24
0381		Source T add. s/p 2	0	2044	1800	D-Par	2	R/W off	U16	24
0382	[1]	Source Isd-extern	0	2044	2000	D-Par	2	R/W off	U16	25

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0385		Select KTY / PTC	0	2	2		2	R/W off	U16	30
		parameter value:	0 = without 1 = KTY 2 = PTC							
0386		KTY Alarm	30	180	135	¦C	1	R/W on	U16	30
0387		KTY Fault	30	195	155	¦C	1	R/W on	U16	30
0388		PTC Evaluation	0	1	1		2	R/W off	U16	30
		parameter value:	0 = warning 1 = switch off							
0389		PTC Switch value	1000	4500	4000	Ohm	1	R/W on	S16	30
0390	[1]	Speed normalization	100	80000	1500	1/min	2	R/W on	U32	19
0391		Hysteresis N < Nmin	0.00	100.00	10.00	%	2	R/W on	S16	19
0392		Threshold N < Nmin	0.00	120.00	1.00	%	2	R/W on	S16	19
0393		Hysteresis N < Nx	0.00	100.00	10.00	%	2	R/W on	S16	19
0394		Threshold N < Nx	0.00	120.00	50.00	%	2	R/W on	S16	19
0395	[1]	Threshold N > Nmax	0	100000	2000	1/min	2	R/W on	U32	19
0396		Source x1 comp. 1	0	2044	1800	D-Par	2	R/W off	U16	43
0397		Hysteresis x1:xs1	0.00	100.00	10.00	%	1	R/W on	S16	43
0398		Fixvalue xs1 comp 1	-199.99	199.99	0.00	%	1	R/W on	S16	43
0399		Source x2 comp. 2	0	2044	1800	D-Par	2	R/W off	U16	43
0400		Hysteresis x2:xs2	0.00	100.00	10.00	%	1	R/W on	S16	43
0401		Fixvalue xs2 comp 2	-199.99	199.99	0.00	%	1	R/W on	S16	43
0402		Source xs1 comp 1	0	2044	1800	D-Par	2	R/W off	U16	43
0403		Select fixval comp1	0	1	1		2	R/W off	U16	43
		parameter value:	0 = variable source 1 = fixvalue							
0404		Source xs2 comp 2	0	2044	1800	D-Par	2	R/W off	U16	43
0405		Select xs2 comp 2	0	1	1		2	R/W off	U16	43
		parameter value:	0 = variable source 1 = fixvalue							

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0406		Source x0 pos i/p	0	2044	1800	D-Par	2	R/W off	U16	43
0407		Source x0 neg i/p	0	2044	1800	D-Par	2	R/W off	U16	43
0408		Hysteresis x0:xs0	0.00	100.00	10.00	%	1	R/W on	S16	43
0409		Fixvalue xs0	-199.99	199.99	1.00	%	1	R/W on	S16	43
0420		G2 Encoder typ	0	1	0		2	R/W off	U16	
		parameter value:	0 = sine/cosine Encoder 1 = Incremental Encoder							
0421		G2 Encod.increments	1	8192	256		2	R/W off	U16	
0422		G2 adjust mode	0	2	2		2	R/W off	U16	
		parameter value:	0 = off 1 = auto offset 2 = auto offset+amplit.							
0428		G2 debug adress 1	0	65535	0		2	R/W on	U16	
0429		G2 debug adress 2	0	65535	0		2	R/W on	U16	
0434		Src analog output	0	2044	1804	D-Par	2	R/W off	U16	10
0435	[8]	Fixvalue for Dxxxx	-199.99	199.99	0.00	%	1	R/W on	S16	6
0436		Mode analog output	0	2	0		2	R/W on	U16	10
		parameter value:	0 = +10V signal source 1 = -10V signal source 2 = analogue output							
0437		Src 1 multiplier 1	0	2044	1800	D-Par	2	R/W off	U16	37
0438		Src 2 multiplier 1	0	2044	1800	D-Par	2	R/W off	U16	37
0439		Src invert multip.1	0	2044	1700	D-Par	2	R/W off	U16	37
0440		Src 1 multiplier 2	0	2044	1800	D-Par	2	R/W off	U16	37
0441		Src 2 multiplier 2	0	2044	1800	D-Par	2	R/W off	U16	37
0442		Src invert multip.2	0	2044	1700	D-Par	2	R/W off	U16	37
0443		Src 1 multiplier 3	0	2044	1800	D-Par	2	R/W off	U16	37
0444		Src 2 multiplier 3	0	2044	1800	D-Par	2	R/W off	U16	37
0445		Src 3 mul/add 3	0	2044	1800	D-Par	2	R/W off	U16	37
0446		Source 1 XOR	0	2044	1700	D-Par	2	R/W off	U16	45

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0447		Source 2 XOR	0	2044	1700	D-Par	2	R/W off	U16	45
0458		Ramp friction test	0.1	3200.0	10.0	sec	1	R/W on	U16	31
0460		Src digital out 1	0	2044	1709	D-Par	2	R/W off	U16	7
0461		Mode dig. in/out 1	0	4	3		2	R/W off	U16	7
		parameter value:	: 3 = direct 4 = inverted							
0462		Src digital out 2	0	2044	1730	D-Par	2	R/W off	U16	7
0463		Mode dig. in/out 2	0	4	3		2	R/W off	U16	7
		parameter value:	: 3 = direct 4 = inverted							
0464		Src digital out 3	0	2044	1732	D-Par	2	R/W off	U16	7
0465		Mode dig. in/out 3	0	4	3		2	R/W off	U16	7
		parameter value:	: 3 = direct 4 = inverted							
0466		Src relay output	0	2044	1733	D-Par	2	R/W off	U16	7
0467		Mode relay output	0	1	1		2	R/W off	U16	7
		parameter value:	0 = relay direct 1 = relay inverted							
0470	[5]	Source SI1 PZD	0	2044	1800	D-Par	2	R/W on	U16	11
0471		Mode dig. in/out 1	0	1	0		2	R/W on	U16	7
		parameter value:	0 = input 1 = output							
0473		Mode dig. in/out 2	0	1	0		2	R/W on	U16	7
		parameter value:	0 = input 1 = output							
0475		Mode dig. in/out 3	0	1	0		2	R/W on	U16	7
		parameter value:	0 = input 1 = output							
0480	[9]	Source SI2 PZD	0	2044	1800	D-Par	2	R/W on	U16	48
0491	[9]	Source SI4 PZD	0	2044	1800	D-Par	2	R/W off	U16	49
0493	[9]	SynchroLink PZD-src	0	2044	1800	D-Par	2	R/W off	U16	51
0494	[11]	Source SI6 PZD X13	0	2044	1800	D-Par	2	R/W off	U16	12

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0496		SyLi Rx watchdog	0	4	0		2	R/W on	U16	
		parameter value:	0 = no reaction 1 = warning 2 = fault 3 = warning & clearData 4 = fault & clearData							
0497		SyLi Rx timeout	1	60000	1	ms	2	R/W on	U16	
0498		SynchroLink Mode	0	6	2		2	R/W off	U16	
		parameter value:	0 = master peer-to-peer 1 = master mixed mode 2 = slave peer-to-peer 3 = slave mixed mode 4 = slave broadcast 5 = unsync.Peer-to-peer 6 = unsync. broadcast							
0499		RS232 baudrate X11	0	7	5		2	R/W on	U16	
		parameter value:	0 = 1200 Baud 1 = 2400 Baud 2 = 4800 Baud 3 = 9600 Baud 4 = 19200 Baud 5 = 38400 Baud 6 = 57600 Baud 7 = 76800 Baud							
0500		SI1 protocol type	0	5	2		2	R/W on	U16	
		parameter value:	0 = no protocol 1 = USS 4/2 words 2 = USS 4/6 words 3 = USS 0/2 words 4 = USS 0/6 words 5 = USS 4/0 words							
0501		SI1 baudrate	0	6	5		2	R/W on	U16	
		parameter value:	0 = 1200 Baud 1 = 2400 Baud 2 = 4800 Baud 3 = 9600 Baud 4 = 19200 Baud 5 = 38400 Baud 6 = 76800 Baud							
0502		SI1 parity	0	2	2		2	R/W on	U16	
		parameter value:	0 = no parity 1 = odd 2 = even							
0503		SI1 stop bits	1	2	1		2	R/W on	U16	
0504	[1]	SI1 slave address	0	31	0		2	R/W on	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0505		SI1 Rx watchdog	0	2	2		2	R/W on	U16	
		parameter value:	0 = no reaction 1 = warning 2 = fault							
0506		SI1 Rx timeout	0.1	60.0	0.1	sec	2	R/W on	U16	
0507		P-to-P operat. mode	0	1	0		2	R/W off	U16	
		parameter value:	0 = Outp. U3 = Outp. U2 1 = Outp. U3 = Inp. U1							
0509		SI2 function	0	3	0		2	R/W on	U16	
		parameter value:	0 = all active 1 = no warning 2 = no fault 3 = disabled							
0510		P-to-P protocoll	6	10	8		2	R/W on	U16	
		parameter value:	6 = P-to-P 1 word 7 = P-to-P 2 words 8 = P-to-P 3 words 9 = P-to-P 4 words 10 = P-to-P 5 words							
0511		P-to-P baudrate	3	8	8		2	R/W on	U16	
		parameter value:	3 = 9600 Baud 4 = 19200 Baud 5 = 38400 Baud 6 = 76800 Baud 7 = 115200 Baud 8 = 230400 Baud							
0512		CAN baudrate	0	7	6		2	R/W on	U16	
		parameter value:	0 = reserve 1 = reserve 2 = reserve 3 = reserve 4 = 125 kBaud 5 = 250 kBaud 6 = 500 kBaud 7 = 1 MBaud							
0515	[3]	CAN Tx ID-number	128	1024	176		2	R/W on	U16	
0516	[3]	CAN Rx ID-number	128	1024	160		2	R/W on	U16	
0517	[2]	CAN Tx PZD clock	0	255	254	ms	2	R/W on	U16	
0518	[1]	IBS watchd.function	0	3	0		2	R/W on	U16	
		parameter value:	0 = no action 1 = fault 2 = inverter OFF 3 = fast stop							
0519	[1]	IBS watchd. timeout	0	65535	65535	ms	2	R/W on	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0520		IBS register length	2	10	3		2	R/W on	U16	
0522	[1]	PB baudrate	0	14	0		0	Read	U16	
		parameter value:	0 = initialization 1 = 9600 Baud 2 = 19200 Baud 3 = 38400 Baud 4 = 93750 Baud 5 = 187500 Baud 6 = 500000 Baud 7 = 1.5 MBaud 8 = 57600 Baud 9 = 76800 Baud 10 = 115200 Baud 11 = 3.0 MBaud 12 = 6.0 MBaud 13 = 12.0 MBaud 14 = 45450 Baud						
0523		PB address	3	124	9		2	R/W on	U16	
0524		PB CLR-DATA	0	1	0		2	R/W on	U16	
		parameter value:	0 = no reaction 1 = fault							
0525	[1]	PB PPO-TYPE	0	6	0		0	Read	U16	
		parameter value:	0 = initialization 1 = 4/2 words 2 = 4/6 words 3 = 0/2 words 4 = 0/6 words 5 = 4/10 words 6 = 0/10 words							
0526		SI2 Rx watchdog	0	2	0		2	R/W on	U16	
		parameter value:	0 = no reaction 1 = warning 2 = fault							
0527		SI2 Rx timeout	0.01	60.00	0.01	sec	2	R/W on	U16	
0535	[1]	v/f Stall.protect Kp	0.00	0.00	0.10		2	R/W on	U16	
0536	[1]	v/f Stall.protect Tn	0	5000	5	ms	2	R/W on	U16	
0547	[1]	v/f: Kp curr.limit.	0.00	128.00	0.10		2	R/W on	U16	26
0548	[1]	v/f CurrentContr Tn	0	5000	10	ms	2	R/W on	U16	26
0564		Ain1 react on i<4mA	0	2	1		2	R/W on	U16	8
		parameter value:	0 = no reaction 1 = warning 2 = fault							
0571		Src base speed ON	0	2044	1701	D-Par	2	R/W off	U16	20
0572		Src AND RFG-enable	0	2044	1701	D-Par	2	R/W off	U16	21

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0573		Src OR RFG-enable	0	2044	1700	D-Par	2	R/W off	U16	21
0575		Src x2 AuxContr.	0	2044	1800	D-Par	2	R/W off	U16	34
0576		Src ResetIndexSynch	0	2044	1700	D-Par	2	R/W off	U16	28
0577		Src RFG fast stop	0	2044	1700	D-Par	2	R/W off	U16	21
0578		Src T-s/p 3 switch	0	2044	1700	D-Par	2	R/W off	U16	24
0579		Src T-s/p 3	0	2044	1800	D-Par	2	R/W off	U16	24
0580		SC S&H-reset(inv)	0	2044	1701	D-Par	2	R/W off	U16	23
0581		SI2-watchdog OFF	0	2044	1700	D-Par	2	R/W off	U16	
0582	[1]	fixvalue for D164x	0	65535	0		2	R/W on	U16	6
0583	[15]	Src i/p 0 gate	0	2044	1700	D-Par	2	R/W off	U16	44
0584	[15]	Src i/p 1 gate	0	2044	1700	D-Par	2	R/W off	U16	44
0585	[15]	Src i/p 2 gate	0	2044	1700	D-Par	2	R/W off	U16	44
0586	[15]	Function gate	0	22	0		2	R/W off	U16	44
		parameter value:	0 = And 1 = Or 2 = Xor 3 = RS-memory 4 = D-Latch 5 = Sample & hold 6 = angle add 7 = angle subtract 8 = symetric limiter 9 = 3 input limiter 10 = processData switch 11 = comparator 12 = window comparator 13 = absolute comparator 14 = 3-Input And 15 = 3-Input Or 16 = And - Or 17 = Nand - Or 18 = Or - And 19 = Nor - And 20 = Xor - And 21 = Xor - Or 22 = invert / NAND						
0587	[3]	Src timer modul	0	2044	1700	D-Par	2	R/W off	U16	46

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0588	[3]	Timer modul: mode	0	9	0		2	R/W on	U16	46
		parameter value:	0 = ON delay 1 = OFF delay 2 = pulse 3 = extended pulse 4 = pulse generator sym 5 = pulse generator 6 = ramp generator sym. 7 = ramp generator sign 8 = ramp generator val. 9 = PT1 / DT1 module							
0589	[3]	Timer modul: time 1	0.00	650.00	0.10	sec	2	R/W on	U16	46
0590		4 to 1 coder enable	0	2044	1701	D-Par	2	R/W off	U16	27
0591		4 to 1 coder bit0	0	2044	1700	D-Par	2	R/W off	U16	27
0592		4 to 1 coder bit1	0	2044	1700	D-Par	2	R/W off	U16	27
0593		4 to 1 coder bit2	0	2044	1700	D-Par	2	R/W off	U16	27
0594		4 to 1 coder bit3	0	2044	1700	D-Par	2	R/W off	U16	27
0596	[3]	Timer modul: time 2	0.00	650.00	0.10	sec	2	R/W on	U16	46
0600		Source var. droop	0	2044	1800	D-Par	2	R/W off	U16	23
0601		Offset var. droop	-199.99	199.99	0.00	%	1	R/W on	S16	23
0602		Gain variable droop	0.000	10.000	1.000		1	R/W on	U16	23
0603		Limit var. droop	0.00	10.00	0.00	%	1	R/W on	U16	23
0604		Select droop mode	0	1	1		2	R/W off	U16	23
		parameter value:	0 = variable source 1 = fixvalue							
0605		Src ramp parking	0	2044	1700	D-Par	2	R/W off	U16	21
0606		Position s/p	0.00	359.99	0.00	¦	1	R/W on	U16	
0612		Src multiplier i/p	0	2044	1800	D-Par	2	R/W off	U16	36
0613		Src multipl. factor	0	2044	1700	D-Par	2	R/W off	U16	36
0614	[1]	Multiplier factor	-1.000.000	1.000.000	100.000		1	R/W on	S32	36
0622		reset act. position	0	2044	1696	D-Par	2	R/W off	U16	28
0623		Ext.BR: Resistance	0.1	199.9	199.9	Ohm	2	R/W on	U16	
0624		Ext.BR: Rated power	0.1	999.9	1.0	kW	2	R/W on	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0625		Ext.BR: Heatup time	1.0	999.9	1.0	sec	2	R/W on	U16	
0628	[1]	Src SC add setpoint	0	2044	1800	D-Par	2	R/W off	U16	23
0633	[1]	Encod.Adj. offs.sin	-50.00	50.00	0.00	%	2	R/W on	S16	13
0634	[1]	Encod.Adj. offs.cos	-50.00	50.00	0.00	%	2	R/W on	S16	13
0635	[1]	Encod.Adj. ampl.sin	50.00	100.00	100.00	%	2	R/W on	S16	13
0636	[1]	Encod.Adj. ampl.cos	50.00	100.00	100.00	%	2	R/W on	S16	13
0637		Enable aux.function	0	4	0		2	R/W off	U16	29
		parameter value:	0 = all disabled 1 = position control on 2 = encoder2 active 3 = encoder2+ pos.contr 4 = anti slide & slip							
0638		Encoder2 resolution	100	8192	1024		2	R/W off	U16	52
0639		Offset position 2	-180.00	179.99	0.00	¦	1	R/W on	S16	52
0640		Enc2 Reset IndexSyn	0	2044	1700	D-Par	2	R/W off	U16	52
0641		Source 2nd mul/div	0	2044	1800	D-Par	2	R/W off	U16	28
0642		Source 1st mul/div	0	2044	1800	D-Par	2	R/W off	U16	28
0643		Mul/div numerator	-16000	16000	5000		2	R/W off	S16	28
0644		Mul/div denominator	1	16000	5000		2	R/W off	U16	28
0645		Src numerator adjst	0	2044	1800	D-Par	2	R/W off	U16	28
0646		Src denominat.adjst	0	2044	1800	D-Par	2	R/W off	U16	28
0647		Src add.setpoint PC	0	2044	1800	D-Par	2	R/W off	U16	29
0648		Src setpoint PC	0	2044	2012	D-Par	2	R/W off	U16	29
0649		Src position f/b	0	2044	2014	D-Par	2	R/W off	U16	29
0650		Src position s/p	0	2044	1700	D-Par	2	R/W off	U16	29
0651		Src position reset2	0	2044	1700	D-Par	2	R/W off	U16	29
0652		Pos. error filter	0.0	5000.0	0.0	ms	1	R/W on	U16	29
0654		PosController Gain	0.000	16.000	0.100		1	R/W on	U16	29
0655		PosContr. integral	0	10000	0	ms	1	R/W on	U16	29

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0656		Src PosContr enable	0	2044	1700	D-Par	2	R/W off	U16	29
0657		Src PosContr +limit	0	2044	2000	D-Par	2	R/W off	U16	29
0658		Src PosContr -limit	0	2044	2001	D-Par	2	R/W off	U16	29
0659		PC o/p sig.polarity	0	2044	1700	D-Par	2	R/W off	U16	29
0687		Source Mset-factor	0	2044	2000	D-Par	2	R/W off	U16	24
0688		Src +value limiter2	0	2044	2008	D-Par	2	R/W off	U16	36
0689		Src -value limiter2	0	2044	2009	D-Par	2	R/W off	U16	36
0690		Timer: on/off	0	2044	1700	D-Par	2	R/W off	U16	
0691		Timer: hours	0	65535	0	h	2	R/W off	U16	
0692		Timer: minutes	0	59	0	min	2	R/W off	U16	
0694		Src endstop right	0	2044	1701	D-Par	2	R/W off	U16	20
0695		Src endstop left	0	2044	1701	D-Par	2	R/W off	U16	20
0710		6 to 1 coder enable	0	2044	1701	D-Par	2	R/W off	U16	42
0711	[5]	6 to 1 coder bit x	0	2044	1700	D-Par	2	R/W off	U16	42
0712	[63]	6 to 1 coder code x	0	65535	0		2	R/W on	U16	42
0713		6 to 1 coder mode	0	1	0		2	R/W off	U16	42
		parameter value:	0 = bit src. P0711.0x. 1 = word src. P0711.00.							
0714		CAN node ID	1	127	3		2	R/W on	U16	
0715		CANopen baudrate	0	7	4		2	R/W on	U16	
		parameter value:	0 = reserve 1 = reserve 2 = reserve 3 = reserve 4 = 125 kBaud 5 = 250 kBaud 6 = 500 kBaud 7 = 1 MBaud							
0716	[2]	CANopen PDO mode	0	255	253		2	R/W on	U16	
0717	[2]	CANopen cycle timer	0	255	0		2	R/W on	U16	
0718		CANopen emergency	0	1	1		2	R/W on	U16	
		parameter value:	0 = off 1 = on							

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0719		CANopen bus off	0	255	0		2	R/W on	U16	
0720		CANopen profile	0	1	0		2	R/W on	U16	
		parameter value:	0 = Std profile DS301 1 = I/O profile DS401							
0732		Copy from keypad	0	2	0		0	R/W on	U16	
		parameter value:	0 = no 1 = yes 2 = identification							
0733		Copy data to keypad	0	1	0		0	R/W on	U16	
		parameter value:	0 = no 1 = yes							
0734		Display contrast	10	20	14		0	R/W on	U16	
0735	[1]	opt.anal in1,2 mode	0	1	0		2	R/W on	U16	50
		parameter value:	0 = voltage input 1 = current input							
0736		anlog Input 2 mode	0	1	0		2	R/W on	U16	50
		parameter value:	0 = 0% ... ±100% 1 = +20% ... +100%							
0740	[1]	src. output block	0	2044	1800	D-Par	2	R/W off	U16	10
0741	[1]	signal output block	0	3	0		1	R/W on	U16	10
		parameter value:	0 = direct 1 = absolute value 2 = inverted 3 = abs. value inverted							
0742	[1]	output block norm.	Jun 26	160.00	100.00	%	1	R/W on	U16	10
0743	[1]	output block	0	1	0		2	R/W on	U16	10
		parameter value:	0 = 0% ... ±100% 1 = +20% ... +100%							
0744	[1]	output block offset	-100.00	100.00	0.00	%	1	R/W on	S16	10
0745		SI4 function	0	3	0		2	R/W on	U16	
		parameter value:	0 = all active 1 = no warning 2 = no fault 3 = disabled							

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0746		SI4 Rx watchdog	0	2	0		2	R/W on	U16	
		parameter value:	0 = no reaction 1 = warning 2 = fault							
0747		SI4 Rx timeout	0.01	60.00	0.01	sec	2	R/W on	U16	
0750		Src SI4 watchdogOFF	0	2044	1700	D-Par	2	R/W off	U16	
0752		Ain2 react on i<4mA	0	2	1		2	R/W on	U16	50
		parameter value:	0 = no reaction 1 = warning 2 = fault							
0768		Illum. display	0	999	10	min	0	R/W on	U16	
0769	[1]	sensles start curr.	0.00	199.99	50.00	%	2	R/W off	U16	17
0770	[1]	sensles start speed	-199.99	199.99	10.00	%	2	R/W off	S16	17
0771	[1]	sensles wait time	0.00	100.00	1.00	sec	2	R/W off	U16	17
0772	[1]	sensles start time	0.00	100.00	5.00	sec	2	R/W off	U16	17
0773	[1]	K speed-observer	0.00	100.00	1.00		2	R/W off	U16	17
0774	[1]	G speed-estimation	0.00	100.00	3.00	%	2	R/W off	U16	17
0775	[1]	Tn speed-estimation	0	5000	10	ms	2	R/W off	U16	17
0779		sign angle signal	0	1	0		2	R/W off	U16	13
		parameter value:	0 = + direct measuring 1 = - neg. measuring							

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0780		resolution/mot-turn	0	22	2		2	R/W off	U16	27
		parameter value:	0 = 1024 increments 1 = 2048 increments 2 = 4096 increments 3 = 8192 increments 4 = 16384 increments 5 = 32768 increments 6 = 65536 increments 7 = 2exp17 increments 8 = 2exp18 increments 9 = 2exp19 increments 10 = 2exp20 increments 11 = 2exp21 increments 12 = 2exp22 increments 13 = 2exp23 increments 14 = 2exp24 increments 15 = 2exp25 increments 16 = 2exp26 increments 17 = 2exp27 increments 18 = 2exp28 increments 19 = 2exp29 increments 20 = 2exp30 increments 21 = 2exp31 increments 22 = 2exp32 increments						
0781		diameter/perimeter	0.001	10.000.000	1.000		2	R/W off	U32	27
0782		gear ratio	0.001	100.000.000	100.000		2	R/W off	U32	27
0783		switch diam./perim.	0	1	0		2	R/W off	U16	27
		parameter value:	0 = diameter (P0781*PI) 1 = perimeter (P0781* 1)							
0784		Src position switch	0	2044	1673	D-Par	2	R/W off	U16	27
0785	[15]	position s/p array	-1.000.000.000	1.000.000.000	0.000		2	R/W on	S32	27
0786		tolerance posSensor	0.000	20.000	1.000		2	R/W off	U16	29
0787		hysteres. posSensor	0.000	10.000	0.500		2	R/W off	U16	29
0788		Enable reset posit.	0	2044	1701	D-Par	2	R/W off	U16	28
0789		position reference	-100.000.000	10.000.000	0.000		2	R/W off	S32	28
0790		HiWord 16/32Convert	0	2044	1800	D-Par	2	R/W off	U16	27
0791		LoWord 16/32Convert	0	2044	1800	D-Par	2	R/W off	U16	27
0792		reset positionOffse	0	2044	1700	D-Par	2	R/W off	U16	29
0793		linearPart squ.root	0.00	100.00	0.00	%	1	R/W on	U16	29
0794		weighting pos.error	0	1	0		2	R/W off	U16	29
		parameter value:	0 = factor 1 1 = factor 1/65536							

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
0795		Src position f/b-2	0	2044	1800	D-Par	2	R/W off	U16	29
0796		angle:angle-adjust	0	2044	1800	D-Par	2	R/W off	U16	28
0797		speed:angle-adjust	0	2044	1800	D-Par	2	R/W off	U16	28
0799		SI1 adr. set 0/1	0	2044	1700	D-Par	2	R/W off	U16	
0810	[1]	rated line-frequ.	45	65	50	Hz	2	R/W off	U16	
0811	[1]	line inductance	0.00	650.00	1.00	mH	2	R/W off	U16	
0812	[1]	line resistance	0.001	10.000	1.000	Ohm	2	R/W off	U16	
0813	[1]	max. frequ. error	0.0	20.0	10.0	Hz	2	R/W off	U16	
0814	[1]	min line voltage	0.00	P 815	0.00	%	2	R/W off	S16	
0815	[1]	max line voltage	P 814	199.99	199.99	%	2	R/W off	S16	
0816	[1]	line: delta angle	-180.00	180.00	0.00	¦	2	R/W on	S16	
0817	[1]	line: magnitude uv	0.00	199.99	100.00	%	2	R/W off	S16	
0818	[1]	line: magnitude vw	0.00	199.99	100.00	%	2	R/W off	S16	
0819	[1]	line: offsetcorr.uv	-199.99	199.99	0.00	%	2	R/W off	S16	
0820	[1]	line: offsetcorr.vw	-199.99	199.99	0.00	%	2	R/W off	S16	
0898		Scratchpad REFU	0.000	2.147.483.647	0.000		2	R/W on	U32	
0899		Scratchpad customer	0.000	2.147.483.647	0.000		2	R/W on	U32	
1017		Ixt-value shorttime	-1000000	1000000	-		0	Read	S32	
1018		Blockparametrizat.	-1	1	0		3	R/W off	S16	
1019	[1]	Data conflict	0	4095	0		0	Read	U16	
1020	[48]	WS PIC data	0	FFFF	0	hex	0	Read	U16	
1021	[5]	option board 1 code	-32768	32767	0		0	Read	S16	
1022	[5]	option board 2 code	-32768	32767	0		0	Read	S16	
1023		panel code	0.0	6553.5	0.0		0	Read	U16	
1090	[3]	DSP debug adr	80000000	7FFFFFFF	0	hex	3	R/W on	U32	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1091	[3]	DSPdebug mode	0	15	0		3	R/W on	U16	
		parameter value:	0 = off 1 = fix Loword 2 = fix Hiword 3 = float 1 4 = float 10 5 = float 100 6 = float 1000 7 = float 1E4 8 = float 1E5 9 = float 1E6 10 = float 0.1 11 = float 0.01 12 = float 1E-3 13 = float 1E-4 14 = float 1E-5 15 = float 1E-6						

2.3 Display parameters

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1030		actual T-rotor	0	65535	-	ms	0	Read	U16	25
1038	[10]	WS-PIC Scan Anz Mst	0	65535	0		0	Read	U16	
1040		actual positionNorm	0.00000	0.00000	-	%	0	Read	U32	27
1041		valid position s/p	2.147.483.648	2.147.483.647	-		0	Read	U32	27
1042		actual position	-2.147.483.648	2.147.483.647	-		0	Read	S32	28
1049		Test ON/OFF	0	1	0		3	R/W off	U16	
1050		Service ON/OFF	0	1	0		-	Read	U16	
1051		DSP controlword	0	0000001F	-	hex	0	Read	U32	
1067		DSP Statusword	0	FFFFFFFF	-	hex	0	Read	U32	
1069		current-out phase U	-200.00	199.99	-	%	0	Read	S16	25
1070		current-out phase V	-200.00	199.99	-	%	0	Read	S16	25
1071		Isq actual	-200.00	199.99	-	%	0	Read	S16	25
1072		Isd actual	-200.00	199.99	-	%	0	Read	S16	25
1073		Is actual	-32768	32767	-		0	Read	S16	25
1074		DC-link voltage	-200.00	199.99	-	%	0	Read	S16	
1075		Voltage amplitude	-200.00	199.99	-	%	0	Read	S16	25
1076		I-contr-out usd	-200.00	199.99	-	%	0	Read	S16	25
1077		I-contr-out usq	-200.00	199.99	-	%	0	Read	S16	25
1078		I-contr: theta-i	-200.00	199.99	-	%	0	Read	S16	13 14 15 16 17 18
1079		DSP PWM time U	-32768	32767	-		0	Read	S16	
1080		DSP PWM time V	-32768	32767	-		0	Read	S16	
1081		DSP PWM time W	-32768	32767	-		0	Read	S16	
1082		act.rotorflux PSIrd	-32768	32767	-		0	Read	S16	25
1083		Slip-frequency	-32.768	32.767	-	Hz	0	Read	S16	25
1084		reso. exitat. phase	-62	61	-		0	Read	S16	
1085		reso. exitat. ampl.	0	125	-		0	Read	S16	
1086		encoder sine-wave	-200.00	199.99	-	%	0	Read	S16	13 15 16
1087		encoder cosine-wave	-200.00	199.99	-	%	0	Read	S16	13 15 16
1089		Encoder signal ampl	-200.00	199.99	-	%	0	Read	S16	13
1092		DSP watch Test 0	-32768	32767	-		0	Read	S16	
1093		DSP watch Test 1	-32768	32767	-		0	Read	S16	
1094		DSP watch Test 2	-32768	32767	-		0	Read	S16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1095		DSP watch Test 3	-32768	32767	-		0	Read	S16	
1096		temp. braking resis	-200.00	199.99	-	%	0	Read	S16	
1098		firmware-date	0	0	0		0	Read	U16	
		parameter value:	0 = 31.Oct.2000 15:40							
1100		SI4: PZD1 -input	-200.00	199.99	-	%	0	Read	S16	49
1101		SI4: PZD2 -input	-200.00	199.99	-	%	0	Read	S16	49
1102		SI4: PZD3 -input	-200.00	199.99	-	%	0	Read	S16	49
1103		SI4: PZD4 -input	-200.00	199.99	-	%	0	Read	S16	49
1104		SI4: PZD5 -input	-200.00	199.99	-	%	0	Read	S16	49
1105		SI4: PZD6 -input	-200.00	199.99	-	%	0	Read	S16	49
1106		SI4: PZD7 -input	-200.00	199.99	-	%	0	Read	S16	49
1107		SI4: PZD8 -input	-200.00	199.99	-	%	0	Read	S16	49
1108		SI4: PZD9 -input	-200.00	199.99	-	%	0	Read	S16	49
1109		SI4: PZD10-input	-200.00	199.99	-	%	0	Read	S16	49
1120		Output-block 1	-200.00	199.99	-	%	0	Read	S16	10
1121		Output-block 2	-200.00	199.99	-	%	0	Read	S16	10
1129		coder output	0	65535	-		0	Read	U16	42
1130		SynchroLink PZD0-in	-20.000.000	19.999.999	-	%	0	Read	S32	51
1131		SynchroLink PZD1-in	-200.00	199.99	-	%	0	Read	S16	51
1132		SynchroLink PZD2-in	-20.000.000	19.999.999	-	%	0	Read	S32	51
1133		SynchroLink PZD3-in	-200.00	199.99	-	%	0	Read	S16	51
1134		SynchroLink PZD4-in	-200.00	199.99	-	%	0	Read	S16	51
1135		SynchroLink PZD5-in	-20.000.000	19.999.999	-	%	0	Read	S32	51
1136		SynchroLink PZD6-in	-200.00	199.99	-	%	0	Read	S16	51
1137		SynchroLink PZD7-in	-20.000.000	19.999.999	-	%	0	Read	S32	51
1138		SynchroLink PZD8-in	-200.00	199.99	-	%	0	Read	S16	51
1139		SynchroLink PZD9-in	-200.00	199.99	-	%	0	Read	S16	51
1160		SI6: PZD1-input X13	-200.00	199.99	-	%	0	Read	S16	12
1161		SI6: PZD2-input X13	-200.00	199.99	-	%	0	Read	S16	12
1162		SI6: PZD3-input X13	-200.00	199.99	-	%	0	Read	S16	12
1163		SI6: PZD4-input X13	-200.00	199.99	-	%	0	Read	S16	12
1164		SI6: PZD5-input X13	-200.00	199.99	-	%	0	Read	S16	12
1165		SI6: PZD6-input X13	-200.00	199.99	-	%	0	Read	S16	12
1166		SI6: PZD7-input X13	-200.00	199.99	-	%	0	Read	S16	12
1167		SI6: PZD8-input X13	-200.00	199.99	-	%	0	Read	S16	12
1168		SI6: PZD9-input X13	-200.00	199.99	-	%	0	Read	S16	12
1169		SI6: PZD10-inp. X13	-200.00	199.99	-	%	0	Read	S16	12
1170		SI6: PZD11-inp. X13	-200.00	199.99	-	%	0	Read	S16	12
1171		SI6: PZD12-inp. X13	-200.00	199.99	-	%	0	Read	S16	12
1176		Control word 3	0	FFFF	-	hex	0	Read	U16	4
1177		Status word 3	0	FFFF	-	hex	0	Read	U16	4
1178		ASS: Torque - dv/dt	-200.00	199.99	-	%	0	Read	S16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1186		3ph.system synch ok	0	1	-		0	Read	U16	
1238		Src control word 3	0	2044	1800	D-Par	2	R/W off	U16	4
1239	[15]	Src stat.word 3 bit	0	2044	1700	D-Par	2	R/W off	U16	4
1240	[15]	SSC: src mod1 inp0	0	2044	1700	D-Par	2	R/W off	U16	47
1241	[15]	SSC: src mod1 inp1	0	2044	1700	D-Par	2	R/W off	U16	47
1242	[15]	SSC: src mod1 inp2	0	2044	1700	D-Par	2	R/W off	U16	47
1243	[15]	SSC: function mod1	0	4	0		2	R/W off	U16	47
		parameter value:	0 = AND Inp1*Inp2*Inp3 1 = OR Inp1+Inp2+Inp3 2 = AND-OR (I1*I2)+I3 3 = OR-AND (I1+I2)*I3 4 = Compare I1>I2							
1244	[15]	SSC: src mod2 inp0	0	2044	1700	D-Par	2	R/W off	U16	47
1245	[15]	SSC: src mod2 inp1	0	2044	1700	D-Par	2	R/W off	U16	47
1246	[15]	SSC: src mod2 inp2	0	2044	1700	D-Par	2	R/W off	U16	47
1247	[15]	SSC: function mod2	0	4	0		2	R/W off	U16	47
		parameter value:	0 = AND Inp1*Inp2*Inp3 1 = OR Inp1+Inp2+Inp3 2 = AND-OR (I1*I2)+I3 3 = OR-AND (I1+I2)*I3 4 = Compare I1>I2							
1248	[15]	SSC: src mod3 inp0	0	2044	1700	D-Par	2	R/W off	U16	47
1249	[15]	SSC: src mod3 inp1	0	2044	1700	D-Par	2	R/W off	U16	47
1250	[15]	SSC: src mod3 inp2	0	2044	1700	D-Par	2	R/W off	U16	47
1251	[15]	SSC: function mod3	0	4	0		2	R/W off	U16	47
		parameter value:	0 = AND Inp1*Inp2*Inp3 1 = OR Inp1+Inp2+Inp3 2 = AND-OR (I1*I2)+I3 3 = OR-AND (I1+I2)*I3 4 = Compare I1>I2							
1252	[15]	SSC: source timer 1	0	2044	1700	D-Par	2	R/W off	U16	47
1253	[15]	SSC: funct. timer 1	0	3	0		2	R/W on	U16	47
		parameter value:	0 = ON delay 1 = OFF delay 2 = pulse 3 = extended pulse							
1254	[15]	SSC: time (timer 1)	0.00	650.00	0.10	sec	2	R/W on	U16	47

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1255	[15]	SSC: source timer 2	0	2044	1700	D-Par	2	R/W off	U16	47
1256	[15]	SSC: funct. timer 2	0	3	0		2	R/W on	U16	47
		parameter value:	0 = ON delay 1 = OFF delay 2 = pulse 3 = extended pulse							
1257	[15]	SSC: time (timer 2)	0.00	650.00	0.10	sec	2	R/W on	U16	47
1258	[15]	SSC: transit.mask A	0	00FF	0	hex	2	R/W on	U16	47
1259	[15]	SSC: A -> next step	0	15	0		2	R/W on	U16	47
1260	[15]	SSC: transit.mask B	0	00FF	0	hex	2	R/W on	U16	47
1261	[15]	SSC: B -> next step	0	15	0		2	R/W on	U16	47
1262	[15]	SSC: transit.mask C	0	00FF	0	hex	2	R/W on	U16	47
1263	[15]	SSC: C -> next step	0	15	0		2	R/W on	U16	47
1264	[15]	SSC: transit.mask D	0	00FF	0	hex	2	R/W on	U16	47
1265	[15]	SSC: D -> next step	0	15	0		2	R/W on	U16	47
1266	[15]	SSC: set bit mask	0	FFFF	0	hex	2	R/W on	U16	47
1267		SSC: src RESET	0	2044	1700	D-Par	2	R/W off	U16	47
1270		SI6 baudrate X13	4	7	6		2	R/W on	U16	12
		parameter value:	4 = 125 kBaud 5 = 250 kBaud 6 = 500 kBaud 7 = 1 MBaud							
1271	[3]	SI6 Tx ID numb. X13	1	2047	176		2	R/W on	U16	12
1272	[3]	SI6 Rx ID numb. X13	1	2047	160		2	R/W on	U16	12
1273	[2]	SI6 Tx PZD clk. X13	0	255	254	ms	2	R/W on	U16	12
1274		SI6 Rx watchdog X13	0	2	2		2	R/W on	U16	12
		parameter value:	0 = no reaction 1 = warning 2 = fault							
1275		SI6 Rx timeout X13	0.01	60.00	0.01	sec	2	R/W on	U16	12
1276		src.SI6-watchd. OFF	0	2044	1700	D-Par	2	R/W off	U16	12
1280		Src ASS enable	0	2044	1700	D-Par	2	R/W off	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1281	[3]	ASS source nact	0	2044	1800	D-Par	2	R/W off	U16	
1282	[2]	ASS nact[i] enable	0	2044	1701	D-Par	2	R/W off	U16	
1283		ASS: source M s/p	0	2044	1800	D-Par	2	R/W off	U16	
1284		ASS: src nist dn/dt	0	2044	1800	D-Par	2	R/W off	U16	
1285		ASS RFG2 startvalue	0.00	199.99	100.00	%	2	R/W on	S16	
1286		ASS RFG2 endvalue	0.00	199.99	0.00	%	2	R/W on	S16	
1287		ASS RFG1 endvalue	0.00	199.99	0.00	%	2	R/W on	S16	
1288		ASS RFG1 T_up slide	0	10000	10	ms	2	R/W on	U16	
1289		ASS RFG1 T_up slip	0	10000	10	ms	2	R/W on	U16	
1290		ASS RFG1 Tdown slid	0	10000	10	ms	2	R/W on	U16	
1291		ASS RFG1 Tdown slip	0	10000	10	ms	2	R/W on	U16	
1292		ASS RFG2 T_up slide	0	10000	10	ms	2	R/W on	U16	
1293		ASS RFG2 T_up slip	0	10000	10	ms	2	R/W on	U16	
1294		ASS RFG2 Tdown slid	0	10000	10	ms	2	R/W on	U16	
1295		ASS RFG2 Tdown slip	0	10000	10	ms	2	R/W on	U16	
1296		ASS comp1 lev.slide	0.00	100.00	0.10	%	2	R/W on	U16	
1297		ASS comp1 lev. slip	0.00	100.00	0.10	%	2	R/W on	U16	
1298		ASS comp1 hyst.slid	0.00	99.99	0.10	%	2	R/W on	U16	
1299		ASS comp1 hyst.slip	0.00	99.99	0.10	%	2	R/W on	U16	
1300		ASS comp2Level slid	0.00	100.00	0.10	%	2	R/W on	U16	
1301		ASS comp2Level slip	0.00	100.00	0.10	%	2	R/W on	U16	
1302		ASS comp2 hyst.slid	0.00	99.99	0.10	%	2	R/W on	U16	
1303		ASS comp2 hyst.slip	0.00	99.99	0.10	%	2	R/W on	U16	
1304		ASS: Pt1-Mset T1	0	10000	10	ms	2	R/W on	U16	
1305		ASS:Dt1-nact T1	0	10000	10	ms	2	R/W on	U16	
1306		ASS:Dt1-nact Td	0	30000	10	ms	2	R/W on	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1307		ASS div-limit	0.00	100.00	0.00	%	2	R/W on	U16	
1309	[1]	v/f: Kp2curr.limit.	0.00	128.00	0.10		2	R/W on	U16	
1311	[1]	RCC: voltage v1	0.0	1000.0	0.0	V	2	R/W on	U16	
1312	[1]	RCC: voltage v3	0.0	1000.0	0.0	V	2	R/W on	U16	
1313	[1]	RCC: phase angle 3	-180.00	180.00	0.00	¦	2	R/W on	S16	
1314	[1]	RCC: voltage v5	0.0	1000.0	0.0	V	2	R/W on	U16	
1315	[1]	RCC: phase angle 5	-180.00	180.00	0.00	¦	2	R/W on	S16	
1316	[1]	RCC: voltage v7	0.0	1000.0	0.0	V	2	R/W on	U16	
1317	[1]	RCC: phase angle 7	-180.00	180.00	0.00	¦	2	R/W on	S16	
1318	[1]	RCC: add. voltage	0.0	1000.0	0.0	V	2	R/W on	U16	
1319	[1]	RCC: add. frequency	0.00	500.00	0.00	Hz	2	R/W on	U16	
1320	[1]	RCC: src mult.f_add	0	2044	2000	D-Par	2	R/W on	U16	
1321	[1]	RCC: src mult.v_add	0	2044	2000	D-Par	2	R/W on	U16	
1480		Control word3 Bit 0	0	1	-		0	Read	U16	4
1481		Control word3 Bit 1	0	1	-		0	Read	U16	4
1482		Control word3 Bit 2	0	1	-		0	Read	U16	4
1483		Control word3 Bit 3	0	1	-		0	Read	U16	4
1484		Control word3 Bit 4	0	1	-		0	Read	U16	4
1485		Control word3 Bit 5	0	1	-		0	Read	U16	4
1486		Control word3 Bit 6	0	1	-		0	Read	U16	4
1487		Control word3 Bit 7	0	1	-		0	Read	U16	4
1488		Control word3 Bit 8	0	1	-		0	Read	U16	4
1489		Control word3 Bit 9	0	1	-		0	Read	U16	4
1490		Control word3 Bit10	0	1	-		0	Read	U16	4
1491		Control word3 Bit11	0	1	-		0	Read	U16	4
1492		Control word3 Bit12	0	1	-		0	Read	U16	4
1493		Control word3 Bit13	0	1	-		0	Read	U16	4
1494		Control word3 Bit14	0	1	-		0	Read	U16	4
1495		Control word3 Bit15	0	1	-		0	Read	U16	4
1496		warning brake-Resis	0	1	-		0	Read	U16	4
1497		Fault brakeResistor	0	1	-		0	Read	U16	
1498		Fault DC-link low	0	1	-		0	Read	U16	
1531		SyncLink RxD active	0	1	-		0	Read	U16	
1532		SyncLink synchroniz	0	1	-		0	Read	U16	

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1533		SyncLink RxD-fail	0	1	-		0	Read	U16	
1534		encoder2 zeroPassed	0	1	-		0	Read	U16	52
1535		Brake res.available	0	1	-		0	Read	U16	
1536		SSC: status bitmask	0	FFFF	-		0	Read	U16	47
1537		SSC: status bit 0	32768	32767	-		0	Read	U16	47
1538		SSC: status bit 1	32768	32767	-		0	Read	U16	47
1539		SSC: status bit 2	32768	32767	-		0	Read	U16	47
1540		SSC: status bit 3	32768	32767	-		0	Read	U16	47
1541		SSC: status bit 4	32768	32767	-		0	Read	U16	47
1542		SSC: status bit 5	32768	32767	-		0	Read	U16	47
1543		SSC: status bit 6	32768	32767	-		0	Read	U16	47
1544		SSC: status bit 7	32768	32767	-		0	Read	U16	47
1545		SSC: status bit 8	32768	32767	-		0	Read	U16	47
1546		SSC: status bit 9	32768	32767	-		0	Read	U16	47
1547		SSC: status bit 10	32768	32767	-		0	Read	U16	47
1548		SSC: status bit 11	32768	32767	-		0	Read	U16	47
1549		SSC: status bit 12	32768	32767	-		0	Read	U16	47
1550		SSC: status bit 13	32768	32767	-		0	Read	U16	47
1551		SSC: status bit 14	32768	32767	-		0	Read	U16	47
1552		SSC: status bit 15	32768	32767	-		0	Read	U16	47
1553		SSC: transition A	32768	32767	-		0	Read	U16	47
1554		SSC: transition B	32768	32767	-		0	Read	U16	47
1555		SSC: transition C	32768	32767	-		0	Read	U16	47
1556		SSC: transition D	32768	32767	-		0	Read	U16	47
1557		SSC: modul 1 outp.1	32768	32767	-		0	Read	U16	47
1558		SSC: modul 1 outp.2	32768	32767	-		0	Read	U16	47
1559		SSC: modul 2 outp.1	32768	32767	-		0	Read	U16	47
1560		SSC: modul 2 outp.2	32768	32767	-		0	Read	U16	47
1561		SSC: modul 3 outp.1	32768	32767	-		0	Read	U16	47
1562		SSC: modul 3 outp.2	32768	32767	-		0	Read	U16	47
1563		SSC: Timer 1	32768	32767	-		0	Read	U16	47
1564		SSC: Timer 2	32768	32767	-		0	Read	U16	47
1565		SSC: actual step	32768	32767	-		0	Read	U16	47
1567		position in toler.	0	1	-		0	Read	U16	29
1568		posit. out of toler	0	1	-		0	Read	U16	29
1569		word position mess.	0	1	-		0	Read	U16	29
1570		position s/p number	0	1	-		0	Read	U16	27
1571		PS control volt. ok	0	1	-		0	Read	U16	
1580		Logic gate 10	-32768	32767	-		0	Read	S16	44
1581		Logic gate 10 not	-32768	32767	-		0	Read	S16	44
1582		Logic gate 11	-32768	32767	-		0	Read	S16	44
1583		Logic gate 11 not	-32768	32767	-		0	Read	S16	44

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1584		Logic gate 12	-32768	32767	-		0	Read	S16	45
1585		Logic gate 12 not	-32768	32767	-		0	Read	S16	45
1586		Logic gate 13	-32768	32767	-		0	Read	S16	45
1587		Logic gate 13 not	-32768	32767	-		0	Read	S16	45
1588		Logic gate 14	-32768	32767	-		0	Read	S16	45
1589		Logic gate 14 not	-32768	32767	-		0	Read	S16	45
1590		Logic gate 15	-32768	32767	-		0	Read	S16	45
1591		Logic gate 15 not	-32768	32767	-		0	Read	S16	45
1608		Init finished	0	1	0		0	Read	U16	
1610		Logic gate 0	0	1	-		0	Read	S16	44
1611		Logic gate 0 not	0	1	-		0	Read	S16	44
1612		Logic gate 1	0	1	-		0	Read	S16	44
1613		Logic gate 1 not	0	1	-		0	Read	S16	44
1614		Logic gate 2	0	1	-		0	Read	S16	44
1615		Logic gate 2 not	0	1	-		0	Read	S16	44
1616		Logic gate 3	0	1	-		0	Read	S16	44
1617		Logic gate 3 not	0	1	-		0	Read	S16	44
1618		Logic gate 4	0	1	-		0	Read	S16	44
1619		Logic gate 4 not	0	1	-		0	Read	S16	44
1620		Timer 0	0	1	-		0	Read	S16	46
1621		Timer 0 not	0	1	-		0	Read	S16	46
1622		Timer 1	0	1	-		0	Read	S16	46
1623		Timer 1 not	0	1	-		0	Read	S16	46
1624		Timer 2	0	1	-		0	Read	S16	46
1625		Timer 2 not	0	1	-		0	Read	S16	46
1626		Timer 3	0	1	-		0	Read	S16	46
1627		Timer 3 not	0	1	-		0	Read	S16	46
1642		fixvalue P582.00	0	65535	-		0	Read	U16	6
1643		fixvalue P582.01	0	65535	-		0	Read	U16	6
1645		EncoderAdjust ready	0	1	-		0	Read	U16	
1650		Logic gate 5	0	1	-		0	Read	S16	44
1651		Logic gate 5 not	0	1	-		0	Read	S16	44
1652		Logic gate 6	0	1	-		0	Read	S16	44
1653		Logic gate 6 not	0	1	-		0	Read	S16	44
1654		Logic gate 7	0	1	-		0	Read	S16	44
1655		Logic gate 7 not	0	1	-		0	Read	S16	44
1656		Logic gate 8	0	1	-		0	Read	S16	44
1657		Logic gate 8 not	0	1	-		0	Read	S16	44
1658		Logic gate 9	0	1	-		0	Read	S16	44
1659		Logic gate 9 not	0	1	-		0	Read	S16	44
1660		Control word1 Bit0	0	1	-		0	Read	U16	2
1661		Control word1 Bit1	0	1	-		0	Read	U16	2

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1662		Control word1 Bit2	0	1	-		0	Read	U16	2
1663		Control word1 Bit3	0	1	-		0	Read	U16	2
1664		Control word1 Bit4	0	1	-		0	Read	U16	2
1665		Control word1 Bit5	0	1	-		0	Read	U16	2
1666		Control word1 Bit6	0	1	-		0	Read	U16	2
1667		Control word1 Bit7	0	1	-		0	Read	U16	2
1668		Operating & [P0089]	0	1	-		0	Read	U16	33
1669		ON Command OR [P90]	0	1	-		0	Read	U16	33
1672		Parameterset	0	1	-		0	Read	U16	5
1673		coder output	0	15	-		0	Read	U16	27
1680		Control word2 Bit 0	0	1	-		0	Read	U16	4
1681		Control word2 Bit 1	0	1	-		0	Read	U16	4
1682		Control word2 Bit 2	0	1	-		0	Read	U16	4
1683		Control word2 Bit 3	0	1	-		0	Read	U16	4
1684		Control word2 Bit 4	0	1	-		0	Read	U16	4
1685		Control word2 Bit 5	0	1	-		0	Read	U16	4
1686		Control word2 Bit 6	0	1	-		0	Read	U16	4
1687		Control word2 Bit 7	0	1	-		0	Read	U16	4
1688		Control word2 Bit 8	0	1	-		0	Read	U16	4
1689		Control word2 Bit 9	0	1	-		0	Read	U16	4
1690		Control word2 Bit10	0	1	-		0	Read	U16	4
1691		Control word2 Bit11	0	1	-		0	Read	U16	4
1692		Control word2 Bit12	0	1	-		0	Read	U16	4
1693		Control word2 Bit13	0	1	-		0	Read	U16	4
1694		Control word2 Bit14	0	1	-		0	Read	U16	4
1695		Control word2 Bit15	0	1	-		0	Read	U16	4
1696		Encoder index pulse	0	1	-		0	Read	U16	14 15 16
1697		MechanicalBrakeOpen	0	1	-		0	Read	U16	33
1698		I*t protection ON	0	1	-		0	Read	U16	25
1699		Current ctrl limit	0	1	-		0	Read	U16	26
1700		Constant logic 0	0	0	0		0	Read	U16	6
1701		Constant logic 1	1	1	1		0	Read	U16	6
1702		SC limiting	0	1	-		0	Read	U16	23
1703		Torque limiting	0	1	-		0	Read	U16	24
1704		RFG active up	0	1	-		0	Read	U16	31
1705		RFG active down	0	1	-		0	Read	U16	31
1706		RFG s/p reached	0	1	-		0	Read	U16	31
1707		Alarm motor temp.	0	1	-		0	Read	U16	30
1708		Fault motor temp.	0	1	-		0	Read	U16	30
1709		N actual < Nmin	0	1	-		0	Read	U16	19
1710		N actual < Nx	0	1	-		0	Read	U16	19

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1711		Overspeed	0	1	-		0	Read	U16	19
1712		comp: x1 > xs1	0	1	-		0	Read	U16	43
1713		comp: x2 > xs2	0	1	-		0	Read	U16	43
1714		Digital Input 1	0	1	-		0	Read	U16	7
1715		Digital Input 2	0	1	-		0	Read	U16	7
1716		Digital Input 3	0	1	-		0	Read	U16	7
1717		Digital Input 4	0	1	-		0	Read	U16	7
1718		Digital Input 5	0	1	-		0	Read	U16	7
1722		Digital Output 1	0	1	-		0	Read	U16	7
1723		Digital Output 2	0	1	-		0	Read	U16	7
1724		Digital Output 3	0	1	-		0	Read	U16	7
1725		Relay Output	0	1	-		0	Read	U16	7
1727		RFG stop	0	1	-		0	Read	U16	21
1728		RFG reset	0	1	-		0	Read	U16	21
1729		S/P limiter active	0	1	-		0	Read	U16	22
1730		Status ready	0	1	-		0	Read	U16	3
1731		Status ON	0	1	-		0	Read	U16	3
1732		Status operation	0	1	-		0	Read	U16	3
1733		Status fault	0	1	-		0	Read	U16	3
1734		Status not Off2	0	1	-		0	Read	U16	3
1735		Status not faststop	0	1	-		0	Read	U16	3
1736		Status inhibit	0	1	-		0	Read	U16	3
1737		Status alarm	0	1	-		0	Read	U16	3
1738		Statusword 1 bit 8	0	1	-		0	Read	U16	3
1739		Statusword 1 bit 9	0	1	-		0	Read	U16	3
1740		Statusword 1 bit 10	0	1	-		0	Read	U16	3
1741		Statusword 1 bit 11	0	1	-		0	Read	U16	3
1742		Statusword 1 bit 12	0	1	-		0	Read	U16	3
1743		Statusword 1 bit 13	0	1	-		0	Read	U16	3
1744		Statusword 1 Bit 14	0	1	-		0	Read	U16	3
1745		Statusword 1 Bit 15	0	1	-		0	Read	U16	3
1746		Actual speed > Nmin	0	1	-		0	Read	U16	19
1747		Actual speed > Nx	0	1	-		0	Read	U16	19
1748		Comp: x1 < xs1	0	1	-		0	Read	U16	43
1749		Comp: x2 < xs2	0	1	-		0	Read	U16	43
1750		T-controller limit	0	1	-		0	Read	U16	35
1751		Limiter 1 active	0	1	-		0	Read	U16	38
1752		Limiter 2 active	0	1	-		0	Read	U16	36
1753		Limiter 3 active	0	1	-		0	Read	U16	31
1754		EXOR-Gate	0	1	-		0	Read	U16	45
1755		Motor rotation ccw	0	1	-		0	Read	U16	23
1756		Flux o.k.	0	1	-		0	Read	U16	25

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1757		Comp: x0 < xs0	0	1	-		0	Read	U16	43
1758		Comp: x0 > xs0	0	1	-		0	Read	U16	43
1759		Friction test end	0	1	-		0	Read	U16	31
1760		Digital In1 inverse	0	1	-		0	Read	U16	7
1761		Digital In2 inverse	0	1	-		0	Read	U16	7
1762		Digital In3 inverse	0	1	-		0	Read	U16	7
1763		Digital In4 inverse	0	1	-		0	Read	U16	7
1764		Digital In5 inverse	0	1	-		0	Read	U16	7
1768		Controlword 1 bit 8	0	1	-		0	Read	U16	2
1769		Controlword 1 bit 9	0	1	-		0	Read	U16	2
1770		Controlword 1 bit10	0	1	-		0	Read	U16	2
1771		Controlword 1 bit11	0	1	-		0	Read	U16	2
1772		Controlword 1 bit12	0	1	-		0	Read	U16	2
1773		Controlword 1 bit13	0	1	-		0	Read	U16	2
1774		Controlword 1 bit14	0	1	-		0	Read	U16	2
1775		Controlword 1 bit15	0	1	-		0	Read	U16	2
1780		Index pulse passed	0	1	-		0	Read	U16	28
1781		RFG parking	0	1	-		0	Read	U16	21
1783		fault signal LT	0	1	-		0	Read	U16	
1784		Offset PC adjusted	0	1	-		0	Read	U16	29
1785		ASS active	0	1	-		0	Read	U16	
1786		ASS sliding	0	1	-		0	Read	U16	
1787		ASS slipping	0	1	-		0	Read	U16	
1788		Main contactor ctrl	0	1	-		0	Read	U16	
1789		Main contactor On	0	1	-		0	Read	U16	
1790		Brake resistor ON	0	1	-		0	Read	U16	
1791		Pre-charging ON	0	1	-		0	Read	U16	
1793		Fault code	0	511	-		0	Read	U16	
1794		Alarm bits	0	FFFFFFFF	-	hex	0	Read	U32	
1795	[3]	Fault bits	0	FFFFFFFF	-	hex	0	Read	U32	
1796		St. PU:S 1P W21P	0	10111111	0		0	Read	U16	
1797		Outp. fan control	0	1	-		0	Read	U16	
1798		DO Rel321	0	1111	0		0	Read	U16	7
1799		DI 5 43231	0	11111	0		0	Read	U16	7
1800		Fixvalue 0.00%	0.00	0.00	0.00	%	0	Read	S16	6
1801		Analog input 1	-200.00	199.99	-	%	0	Read	S16	8
1802		Output block 2	-200.00	199.99	-	%	0	Read	S16	9
1803		Output block 3	-200.00	199.99	-	%	0	Read	S16	9
1804		Output block 4	-200.00	199.99	-	%	0	Read	S16	9
1805		opt.1 analog input	-200.00	199.99	-	%	0	Read	S16	50
1806		opt.2 analog input	-200.00	199.99	-	%	0	Read	S16	50
1807		Analog inp.1 direct	-200.00	199.99	-	%	0	Read	S16	8

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1808		TC PT1-Modul 1	-200.00	199.99	-	%	0	Read	S16	38
1809		TC PT1-Modul 2	-200.00	199.99	-	%	0	Read	S16	38
1810		Limiter 1 o/p	-200.00	199.99	-	%	0	Read	S16	38
1811		Gain-Modul	-200.00	199.99	-	%	0	Read	S16	38
1812		Gain-Modul+Offset	-200.00	199.99	-	%	0	Read	S16	38
1813		Changeover switch 1	-200.00	199.99	-	%	0	Read	S16	38
1814		Changeover switch 2	-200.00	199.99	-	%	0	Read	S16	38
1815		TC normalization	-200.00	199.99	-	%	0	Read	S16	35
1816		TC actual value	-200.00	199.99	-	%	0	Read	S16	35
1817		TC actual value+TD	-200.00	199.99	-	%	0	Read	S16	35
1818		TC error signal	-200.00	199.99	-	%	0	Read	S16	35
1819		TC setpoint	-200.00	199.99	-	%	0	Read	S16	35
1820		TC output	-200.00	199.99	-	%	0	Read	S16	35
1821		TC o/p normalized	-200.00	199.99	-	%	0	Read	S16	35
1822		TC o/p norm + s/p	-200.00	199.99	-	%	0	Read	S16	35
1823		S/P integrator	-200.00	199.99	-	%	0	Read	S16	41
1824		Free characteristic	-200.00	199.99	-	%	0	Read	S16	40
1825		Additional s/p 1	-200.00	199.99	-	%	0	Read	S16	22
1826		Factor add. s/p 2	-200.00	199.99	-	%	0	Read	S16	22
1827		Additional s/p 3	-200.00	199.99	-	%	0	Read	S16	22
1828		Additional s/p 2	-200.00	199.99	-	%	0	Read	S16	22
1829		Speed s/p delta v	-200.00	199.99	-	%	0	Read	S16	22
1830		Setpoint sum o/p	-200.00	199.99	-	%	0	Read	S16	22
1831		Multiplier	-200.00	199.99	-	%	0	Read	S16	36
1832		Main setpoint	-200.00	199.99	-	%	0	Read	S16	20
1833		Ramp generator i/p	-200.00	199.99	-	%	0	Read	S16	20
1834		Ramp generator o/p	-200.00	199.99	-	%	0	Read	S16	21
1835		Rampgenerator dv/dt	-200.00	199.99	-	%	0	Read	S16	21
1836		Limiter 2 o/p	-200.00	199.99	-	%	0	Read	S16	36
1837		Multiply/divide	-200.00	199.99	-	%	0	Read	S16	36
1838		Additional s/p 4	-200.00	199.99	-	%	0	Read	S16	22
1839		Setpoint limit i/p	-200.00	199.99	-	%	0	Read	S16	22
1840		Setpoint limit o/p	-200.00	199.99	-	%	0	Read	S16	23
1841		Notch-filter o/p	-200.00	199.99	-	%	0	Read	S16	19
1842		Friction compens'n	-200.00	199.99	-	%	0	Read	S16	31
1843		Inertia compens'n	-200.00	199.99	-	%	0	Read	S16	31
1844		Limiter 3 o/p	-200.00	199.99	-	%	0	Read	S16	31
1845		Sum add. torque s/p	-200.00	199.99	-	%	0	Read	S16	31
1846		AC error signal	-200.00	199.99	-	%	0	Read	S16	34
1847		Adaption SC gain	-200.00	199.99	-	%	0	Read	S16	23
1848		SC gain	-128.0	128.0	-		0	Read	S16	23
1849		SC integral time	32768	32767	-	ms	0	Read	U16	23

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1850		SC speed demand	-200.00	199.99	-	%	0	Read	S16	23
1851		SC feedback	-200.00	199.99	-	%	0	Read	S16	23
1852		SC error signal	-200.00	199.99	-	%	0	Read	S16	23
1853		SC droop	-200.00	199.99	-	%	0	Read	S16	23
1854		SC output	-200.00	199.99	-	%	0	Read	S16	23
1855		SC symmetr. limit	-200.00	199.99	-	%	0	Read	S16	23
1856		SC droop input	-200.00	199.99	-	%	0	Read	S16	23
1857		Aux.Controller o/p	-200.00	199.99	-	%	0	Read	S16	34
1858		Additional T s/p	-200.00	199.99	-	%	0	Read	S16	24
1859		Torque limiter o/p	-200.00	199.99	-	%	0	Read	S16	24
1860		Fixvalue P435.00	-200.00	199.99	-	%	0	Read	S16	6
1861		Fixvalue P435.01	-200.00	199.99	-	%	0	Read	S16	6
1862		Mul/Inv. Modul 1	-200.00	199.99	-	%	0	Read	S16	37
1863		Mul/Inv. Modul 2	-200.00	199.99	-	%	0	Read	S16	37
1864		Mul/Add. Modul 3	-200.00	199.99	-	%	0	Read	S16	37
1865		Torque limiter i/p	-200.00	199.99	-	%	0	Read	S16	24
1866		Torque demand	-200.00	199.99	-	%	0	Read	S16	24
1867		Current s/p Isq*	-200.00	199.99	-	%	0	Read	S16	24
1868		Torque limit 1	-200.00	199.99	-	%	0	Read	S16	24
1869		Torque limit 2	-200.00	199.99	-	%	0	Read	S16	24
1870		Heat sink temp.	-200.00	199.99	-	¦C	0	Read	S16	30
1871		Motor temp. sensor	0	10000	-	Ohm	0	Read	S16	30
1872		Motor temp. linear	-200.00	199.99	-	¦C	0	Read	S16	30
1873		Speed feedback 1	-200.00	199.99	-	%	0	Read	S16	19
1874		Motor current	-200.00	199.99	-	%	0	Read	S16	25
1877		motor temp normal.	-200.00	199.99	-	%	0	Read	S16	30
1878		isd setpoint	-200.00	199.99	-	%	0	Read	S16	25
1879		isq setpoint	-200.00	199.99	-	%	0	Read	S16	25
1880		setpoint queue	-200.00	199.99	-	%	0	Read	S16	20
1882		Isq actual value	-200.00	199.99	-	%	0	Read	S16	25
1883		Isd actual value	-200.00	199.99	-	%	0	Read	S16	25
1884		Isd external s/p	-200.00	199.99	-	%	0	Read	S16	25
1888		Dancing roller i/p	-200.00	199.99	-	%	0	Read	S16	32
1889		Dancing roller o/p	-200.00	199.99	-	%	0	Read	S16	32
1890		Mechanical angle	-20.000.000	19.999.999	-	%	0	Read	S32	13 14 15 16 17 18
1891		Danc_roller upper p	-200.00	199.99	-	%	0	Read	S16	32
1892		Danc_roller lower p	-200.00	199.99	-	%	0	Read	S16	32
1893		MFB 1 Output	-200.00	199.99	-	%	0	Read	S16	39
1894		MFB 2 Output	-200.00	199.99	-	%	0	Read	S16	39

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1895		MFB 3 Output	-200.00	199.99	-	%	0	Read	S16	39
1896		MFB 4 Output	-200.00	199.99	-	%	0	Read	S16	39
1897		Absolute speed sig.	-200.00	199.99	-	%	0	Read	S16	19
1898		[P406] - [P407]	-200.00	199.99	-	%	0	Read	S16	
1900		SI1: PZD1 -input	-200.00	199.99	-	%	0	Read	S16	11
1901		SI1: PZD2 -input	-200.00	199.99	-	%	0	Read	S16	11
1902		SI1: PZD3 -input	-200.00	199.99	-	%	0	Read	S16	11
1903		SI1: PZD4 -input	-200.00	199.99	-	%	0	Read	S16	11
1904		SI1: PZD5 -input	-200.00	199.99	-	%	0	Read	S16	11
1905		SI1: PZD6 -input	-200.00	199.99	-	%	0	Read	S16	11
1910		SI2: PZD1 -input	-200.00	199.99	-	%	0	Read	S16	48
1911		SI2: PZD2 -input	-200.00	199.99	-	%	0	Read	S16	48
1912		SI2: PZD3 -input	-200.00	199.99	-	%	0	Read	S16	48
1913		SI2: PZD4 -input	-200.00	199.99	-	%	0	Read	S16	48
1914		SI2: PZD5 -input	-200.00	199.99	-	%	0	Read	S16	48
1915		SI2: PZD6 -input	-200.00	199.99	-	%	0	Read	S16	48
1916		SI2: PZD7 -input	-200.00	199.99	-	%	0	Read	S16	48
1917		SI2: PZD8 -input	-200.00	199.99	-	%	0	Read	S16	48
1918		SI2: PZD9 -input	-200.00	199.99	-	%	0	Read	S16	48
1919		SI2: PZD10-input	-200.00	199.99	-	%	0	Read	S16	48
1920		Control word 1	0	FFFF	-	hex	0	Read	U16	2 53 54
1921		SI Control word	0	FFFF	-	hex	0	Read	U16	2
1922		Status word 1	0	FFFF	-	hex	0	Read	U16	3 53 54
1923		Control word 2	0	FFFF	-	hex	0	Read	U16	4
1924		Status word 2	0	FFFF	-	hex	0	Read	U16	4
1925		Heat-sink/ motor	0	FFFF	-	hex	0	Read	U16	
1926		Current/Status	0	FFFF	-	hex	0	Read	U16	
1927		Control word KL	0	FFFF	-	hex	0	Read	U16	2
1928		DC link voltage	-200.00	199.99	-	%	0	Read	S16	25
1961		S/C-o/p sample&hold	-200.00	199.99	-	%	0	Read	S16	23
1962		Actual I*t-Limit	-200.00	199.99	-	%	0	Read	S16	25
1967		Fixvalue P435.02	-200.00	199.99	-	%	0	Read	S16	6
1968		Fixvalue P435.03	-200.00	199.99	-	%	0	Read	S16	6
1969		Fixvalue P435.04	-200.00	199.99	-	%	0	Read	S16	6
1970		Variable drp factor	-200.00	199.99	-	%	0	Read	S16	23
1971		Torque s/p+add.1	-200.00	199.99	-	%	0	Read	S16	24
1972		Position s/p	-200.00	199.99	-	%	0	Read	S16	
1977		Multiplier o/p	-200.00	199.99	-	%	0	Read	S16	36
1985		Encoder2 angle	-200.00	199.99	-	%	0	Read	S16	52

Nr	MaxInd	Text	Minwert	Maxwert	Stdwert	Einh.	Pw	Prog	Typ	FP
1986		Encoder2 angle+offs	-200.00	199.99	-	%	0	Read	S16	52
1987		Speed feedback 2	-200.00	199.99	-	%	0	Read	S16	52
1988		Output mul/div 1	-200.00	199.99	-	%	0	Read	S16	28
1989		PC error-signal	-0.00305	0.00305	-	%	0	Read	S32	29
1990		PC error-sig.corr.	-200.00	199.99	-	%	0	Read	S16	29
1991		Pos.Controller o/p	-200.00	199.99	-	%	0	Read	S16	29
1992		ASS RFG1-output	-200.00	199.99	-	%	0	Read	S16	
1993		ASS RFG2-output	-200.00	199.99	-	%	0	Read	S16	
1994		ASS selected dn	-200.00	199.99	-	%	0	Read	S16	
1995		ASS Mset filter	-200.00	199.99	-	%	0	Read	S16	
1996		ASS nact / dt	-200.00	199.99	-	%	0	Read	S16	
1997		ASS mset - n/dt	-200.00	199.99	-	%	0	Read	S16	
1998		Mains voltage	-200.00	199.99	-	%	0	Read	S16	
1999		Output mul/div 2	-200.00	199.99	-	%	0	Read	S16	28
2000		Fixvalue 100.00%	100.00	100.00	100.00	%	0	Read	S16	6
2001		Fixvalue-100.00%	-100.00	-100.00	-100.00	%	0	Read	S16	6
2004		Fixvalue P435.05	-200.00	199.99	-	%	0	Read	S16	6
2005		Fixvalue P435.06	-200.00	199.99	-	%	0	Read	S16	6
2008		Fixvalue P435.07	-200.00	199.99	-	%	0	Read	S16	6
2009		Fixvalue P435.08	-200.00	199.99	-	%	0	Read	S16	6
2012		position setpoint	-20.000.000	19.999.999	-	%	0	Read	S32	27
2013		position s/p LoWord	-200.00	199.99	-	%	0	Read	S16	27
2014		act. position norm.	-20.000.000	19.999.999	-	%	0	Read	S32	28
2015		act.position LoWord	-200.00	199.99	-	%	0	Read	S16	28
2016		16->32bit Converter	-0.00305	0.00305	-	%	0	Read	S32	27
2017		angle adjust module	-20.000.000	19.999.999	-	%	0	Read	S32	27
2029		Heat sink temperat.	-200.00	199.99	-	¦C	0	Read	S16	30
2030		Service PZD1-input	-200.00	199.99	-	%	0	Read	S16	11
2031		Service PZD2-input	-200.00	199.99	-	%	0	Read	S16	11
2032		Service PZD3-input	-200.00	199.99	-	%	0	Read	S16	11
2033		Service PZD4-input	-200.00	199.99	-	%	0	Read	S16	11
2034		Service PZD5-input	-200.00	199.99	-	%	0	Read	S16	11
2035		Service PZD6-input	-200.00	199.99	-	%	0	Read	S16	11

2.4 Explanations regarding the display parameters (D parameters)

The display parameters are called, in the following text, as well as in the function charts, D parameters (D1716 = display parameter No. 1716). D parameters can only be read. Four D parameters can be simultaneously displayed on the operator panel using the monitor (refer to the Instruction Manual, Section 5).

D parameters have no factory setting. When the drive converter is powered-up, they assume a value between "minimum value" and "maximum value" and can continually change during operation, with the exception of the system constants, also refer to Function chart, Sheet 1.

System constants	Constant parameter value
D1700	0 (logical low)
D1701	1 (logical high)
D1800	0.00 %
D2000	100.00 %
D2001	-100.00 %

D parameters can be sub-divided into two groups:

- D parameters for status display and control functions.
- D parameters for process data.

D parameters for status display and control functions

Most of the parameters of this group have only logical status 0 or 1. For 0, the message or function is not active, for 1, appropriately active. If there is a text explanation for a D parameter in the function charts, this is always valid for the logical status 1.

Here are some examples:

D1708	Motor temp. fault	0 = no fault	1 = fault
D1729	Setpoint limiter	0 = not active	1 = active
D1714	Digital input 1	0 = low	1 = high
D1748	Comparison x > xs	0 = x less than xs	1 = x greater than xs

The values of this parameter group have no units and are therefore not normalized, i.e. the value in the parameter list is the same value which is sent via the interface.

D parameters for process signals

The process signals are normalized according to units as follows:

Units	Display/Table		Interface			Example				
Percent (%):	100.00 %	=	4000	Hex	=	16384	Dec	D2000		
Controller Kp:	1.0	=	100	Hex	=	256	Dec	D1848		
Degrees Celsius (°C):	100.00°C	=	4000	Hex	=	16384	Dec	D1872		

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4 Kundenbetreuungsstellen - Sales & Service Facilities

Indramat Refu

Adresse: Indramat Refu GmbH
Uracher Straße 91
72555 Metzingen

Postadresse: 72545 Metzingen – Postfach 1554

Telefon: +49 (0)7123/969-0

Telefax: +49 (0)7123/969-120

Kundendienst - Service

Service Hotline: +49 (0)7123/969-200 (an Werktagen von 8 – 17 Uhr)

Service Telefax: +49 (0)7123/969-220

e-mail: kd@refu.com

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Taiwan ☒ SALES ☐ Service Rexroth Uchida Co., Ltd. No.1, Tsu Chiang Street Tu Cheng Ind. Estate Taipei Hsien, Taiwan, R.O.C. Telefon: +886 2/2 68 13 47 Telefax: +886 2/2 68 53 88			

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Function diagrams **REFUdrive 500 - RD52**
Contens

Rexroth Indramat

P254 — **Control parameters** to changeover switches

P210 — **Value parameters** e.g. to enter percentage values, times, normalization factors etc. The parameters in this documentation are always specified as three characters. When entering, a 0 must first be entered, P210 -> P0210. This is valid for value parameters and control parameters.

P435.0 — **Parameter with index**
The parameter number is located to the left of the point, and the index to the right. The point is only used as separator for parameter number and index, and is **not** a **decimal point**!

D1855 — **Display** or **dispay parameters**
D parameters can be connected as signal sources in variable parameter sources.

D1890 — **32-bit displayparameter**
D parameters with a 32-bit resolution. Signal paths for 32-bit parameters have a double line.

P217 / D1805 — **Variable parameter source**: The required D parameters are entered as signal source in the variable parameter sources. The standard values are entered in the function charts. If no entry is made, then the standard setting D1700 and D1800 apply.

RFG Outp. — **Factory settings** are those entries with gray background. Switch settings are also schown in the factory setting. The factory setting can be replaced ant any time by the customer-specific parameterization.

/ 20.1 — **Target character** "/ 20.1" on e.g. Sheet 20, Field 1

n-*set* — **Process value** "n-set" with signal continuation

Summing points
If the sum is formed from a positive value, then only the negative input at the summing point is designated with a (-).

Control signal to changeover the motor parameter set; signal generator, refer to Function Chart 5.

Analog-Digital converter

Digital-Analog converter

≥1 — **Or logic operation**

& — **And logic operation**

Threshold switch (comparator)

Absolute value generation element

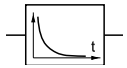
-1 — **Inverter element** for process values

Multiplier element
Example: If, for example, two process values (90% and 128%) are multiplied, the following would be obtained: 0.9 x 1.28 = 1.152 => 115.2 %

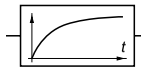
Amplifier

S Q / R $\overline{Q}$ — **R-S flipflop**

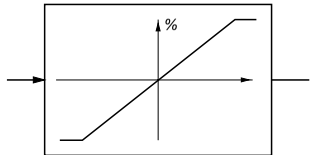
D Q / EN $\overline{Q}$ — **D-latch**



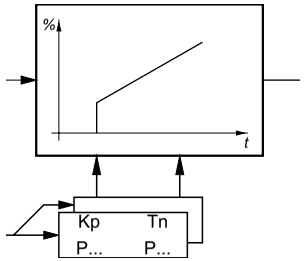
Differentiating element



Filter element, filter



Two-sided **limiter** (positive, negative)



PI controller (proportionaler and integrale controller component)
If the integral action time is set to 0 seconds, the integral control component is disabled and a pure P controller is obtained.
Kp = gain factor of the P controller
Tn = integral action time of the PI controller

t_A: 1 ms **Processing cycle, sampling time**

t_A: 4 T_0 / A1 **Processing cycle** is sub-divided into time sectors, which are dependent on the selected pulse frequency.

Processing sequence within a time sector.

$$T_0 = \frac{1}{\text{pulse frequ.}} \quad \text{e.g.} \quad \frac{1}{8\ \text{kHz}} = 0{,}125\ \text{ms}$$

$$t_A = 4\,T_0 = 4 \times 0{,}125\ \text{ms} = 0{,}5\ \text{ms}$$

Special case: f_p > 8 kHz

All of the function modules, which are identified with $T_A = 4\,T_0$ are processed in 8 T_0.
All of the function modules, which are identified with $T_A = 16\,T_0$ are processed in 32 T_0.

General information

The RD52 series of units, offer, with their open and freely interconnectable function chart structure, an extremely flexible system which can be adapted to the requirements of the particular application. The application is parameterized using the REFUwin Windows program or via the operator panel.
In order to simplify the handling, the closed-loop speed control mode is pre-set with standard values (factory setting). The controller structure, with the most important parameters is shown in the block diagram. In this particular case, the unit is controlled through the terminal strip and with an analog setpoint. The alternative possibilities for control communications are indicated. The reference to the detailed function chart (Sheet No.) is specified in the function blocks.
This means that it is easy to parameterize controller structures going beyond the standard setting.

With the standard values, digital input DE4 is assigned the ON/OFF function and DE5 is assigned the enable function; the setpoint is entered via analog input 1 with 0 to ± 10 V. The analog value can be flexibly adapted using the following normalization location, offset and smoothing.

Procedure when parameterizing a drive

Entering motor data
Parameter P100: Induction/synchronous motor selection; additional data can be taken from the rating plate or the manufacturer's data
.
Entering the encoder data
P130, encoder type selection, pulse number

Current normalization
P374, e. g. the rated motor current is entered, I_N corresponds to 100%

Speed normalization
P390, the motor speed for 100% is entered

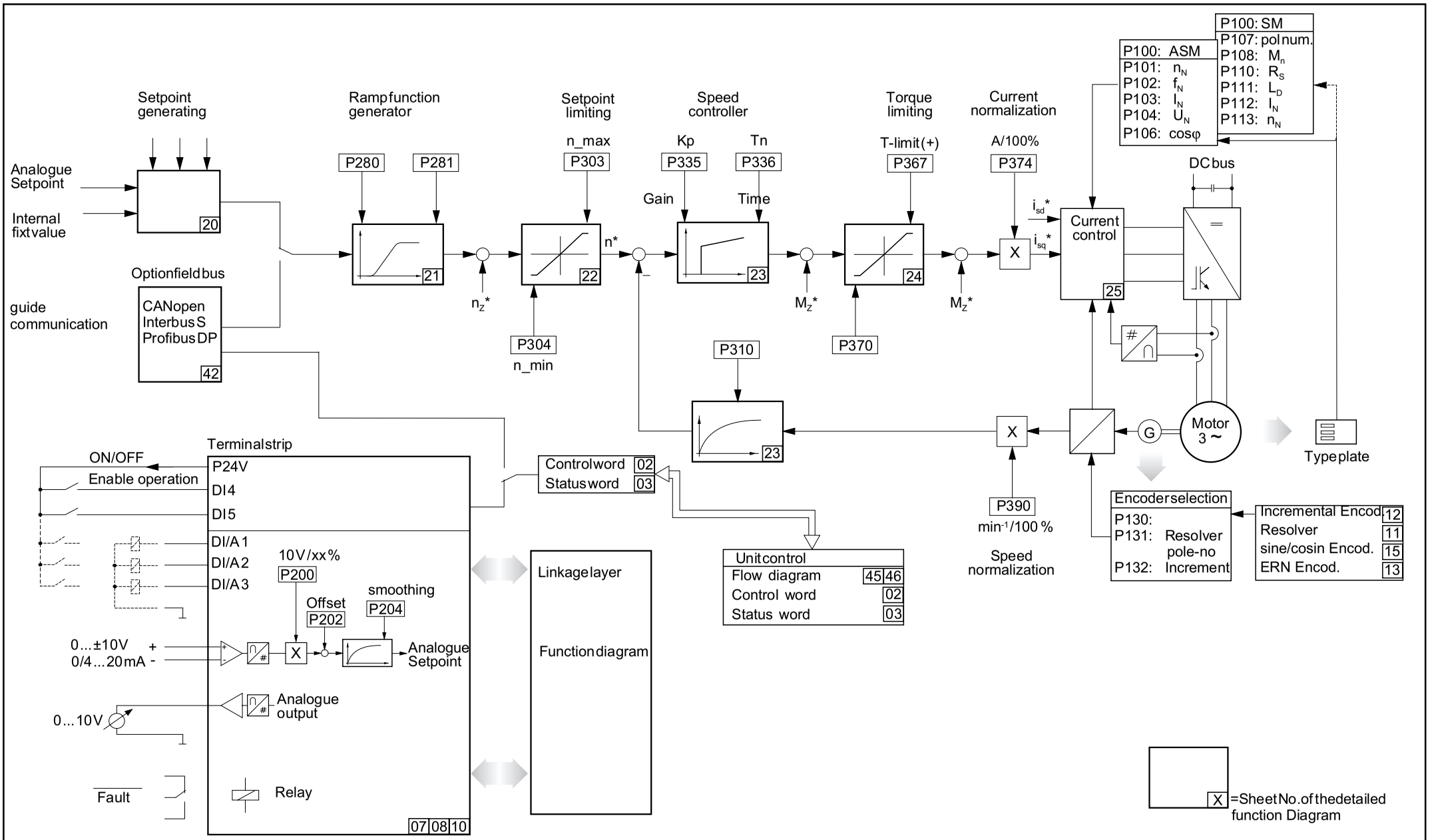
Shutdown, overspeed
P395, according to system-specific safety criteria

After this data has been entered, the drive is parameterized, and can be commissioned, taking into account all of the relevant safety regulations.

The overload capability can be separately set for acceleration and braking up to 200% using the parameters for torque limits P367 (+) and P370 (-). If a higher overload capability of the drive is required, current normalization P374 must be appropriately adapted.

The speed setpoint is transferred to the setpoint limiter n_max / n_min via a ramp-function generator with rounding-off and separately adjustable ramps. After the setpoint/actual value comparison, the system deviation is evaluated in the speed controller with PI characteristics, and fed to the torque limiter. The torque limits can be separately set for acceleration and braking. The resulting torque setpoint is converted into a current setpoint using the current normalization P374, and represents the "torque-generating current component" control quantity for the field-orientated current controller. The "field-generating current components" are generated in the current controller.

The variable quantities are shown as a percentage, speed quantities are referred to parameter P390 (speed normalization), current quantities are referred to parameter P374 (current normalization).



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Overview	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **01**

Generating the control word

The unit is controlled (open-loop) using the control word. The control word comprises 16 bits. Bits 0 to 7 are defined in accordance with the VDI/VDE Directives 3689. Bits 8 to 15 can only be set via the serial interface, and every bit can be freely assigned a unit control function. The control word is generated by logically combining the **control word KL**[1)] and the **control word MS**[1)]. The control word MS can be entered from four sources and selected via a switch. The switch is changed-over using parameter 73.

P73, switch setting 0:

Control word MS is generated from a mask, in which bits 1 to 15 are permanently specified. Only bit 0 can be set to 1 (ON command) or 0 (OFF1 command) using the operator panel.

P73, switch setting 1:

Control word MS[1)] comes from a variable parameter source. Only process data associated with the serial interface can be used in the parameter source. Thus, control word MS is entered via the interface.
In this configuration, bits 8 to 15 can also be set via the serial interface, and each bit can be freely assigned a unit control function. These become effective in the unit by further inter-connecting parameters D1768 to D1775.

P73, switch setting 2:

Control word MS[1)] is generated from a mask, in which bits 0 to 15 are permanently specified. The mask is assigned so that the unit is only controlled using control word KL[1)].

Bits 0 to 7 of control word KL[1)] are permanently assigned control functions. In order to control the unit via the terminal strip, the D parameters of the digital inputs used must be connected to the variable parameter sources (P50.x).

P73, switch setting 3:

Control word MS comes from the service interface RS232. Switch setting 3 is intended for control operation via REFU*win,* which sends its control commands as PZD1.

Note

In order to power-up the unit, in the operating status “Ready to power-up”, the signal in bit 0 must change from 0 to 1. The fault acknowledgement (bit 7) is also only transferred when the signal changes from 0 to 1.

Control word bit assignment

Bits 0 to 7 of control word 1 (D1920) coincide with the functions specified in the VDI/VDE Directives 3689:

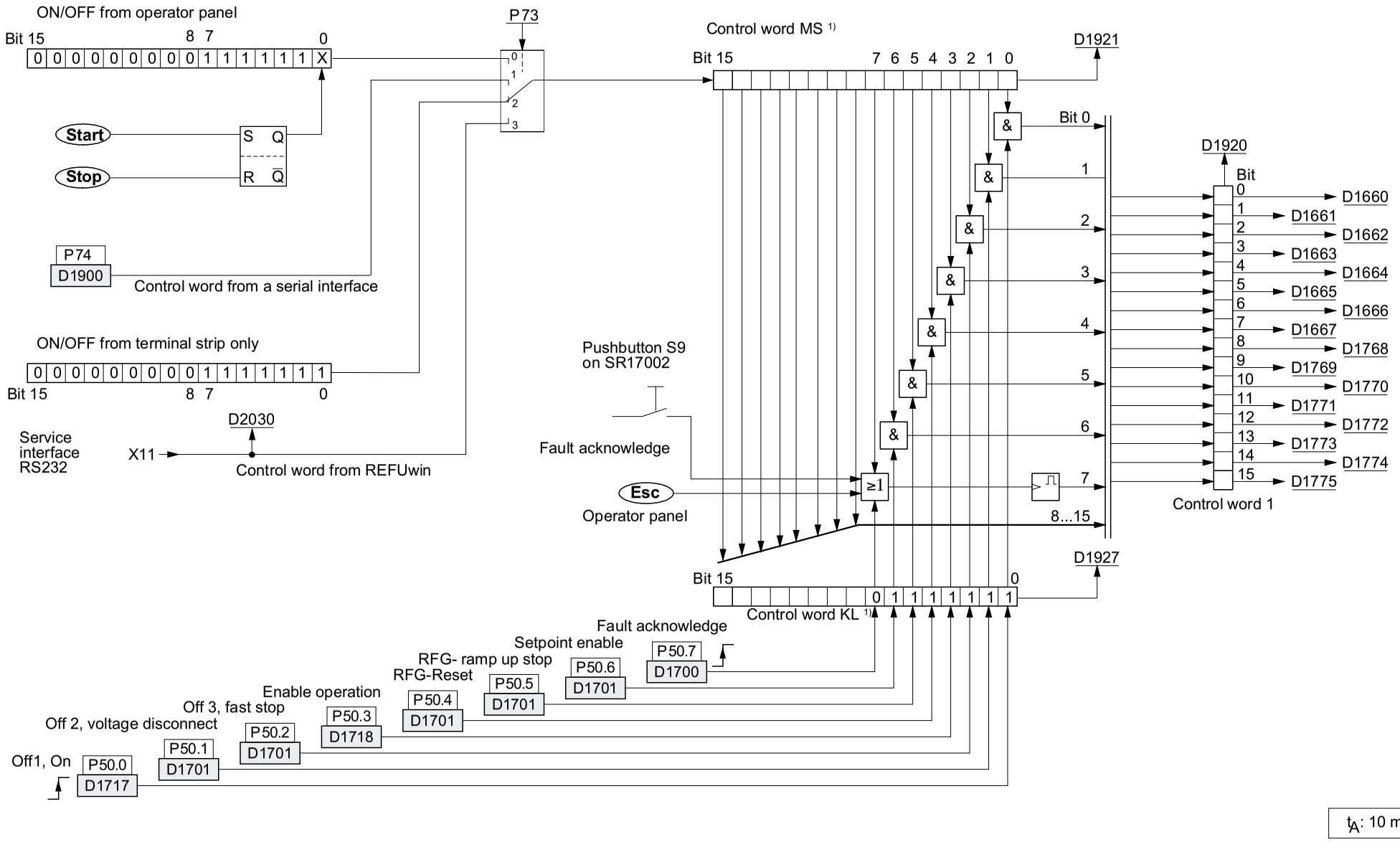
Bit 0	=	ON (L-> H edge) / OFF 1	(L active)
Bit 1	=	OFF 2, power disconnected	(L active)
Bit 2	=	OFF 3, fast stop	(L active)
Bit 3	=	Operation enable	(H active)
Bit 4	=	RFG reset	(L active)
Bit 5	=	Ramp-up stop	(L active)
Bit 6	=	Setpoint enable	(H active)
Bit 7	=	Fault acknowledgement	(L-> H edge)

Bits 8 to 15 can only be entered via the control word from the serial interface. The functions for these bits can be freely configured.

Note

More detailed information about the control/status logic is available in the control and status word flow diagram, function chart Sheets 44 and 45.

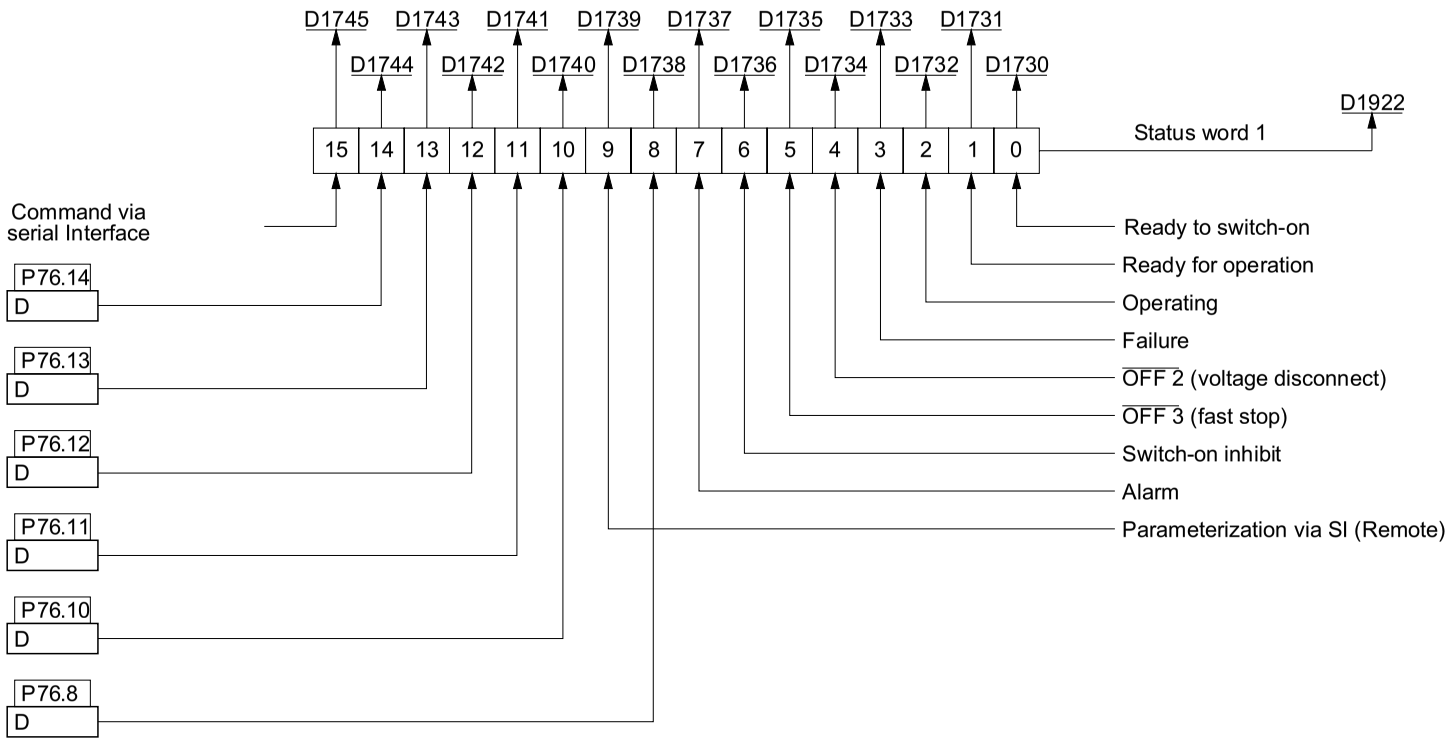
1) Control word KL: KL = terminal strip
Control word MS: MS = mask or interface



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Control word 1	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **02**

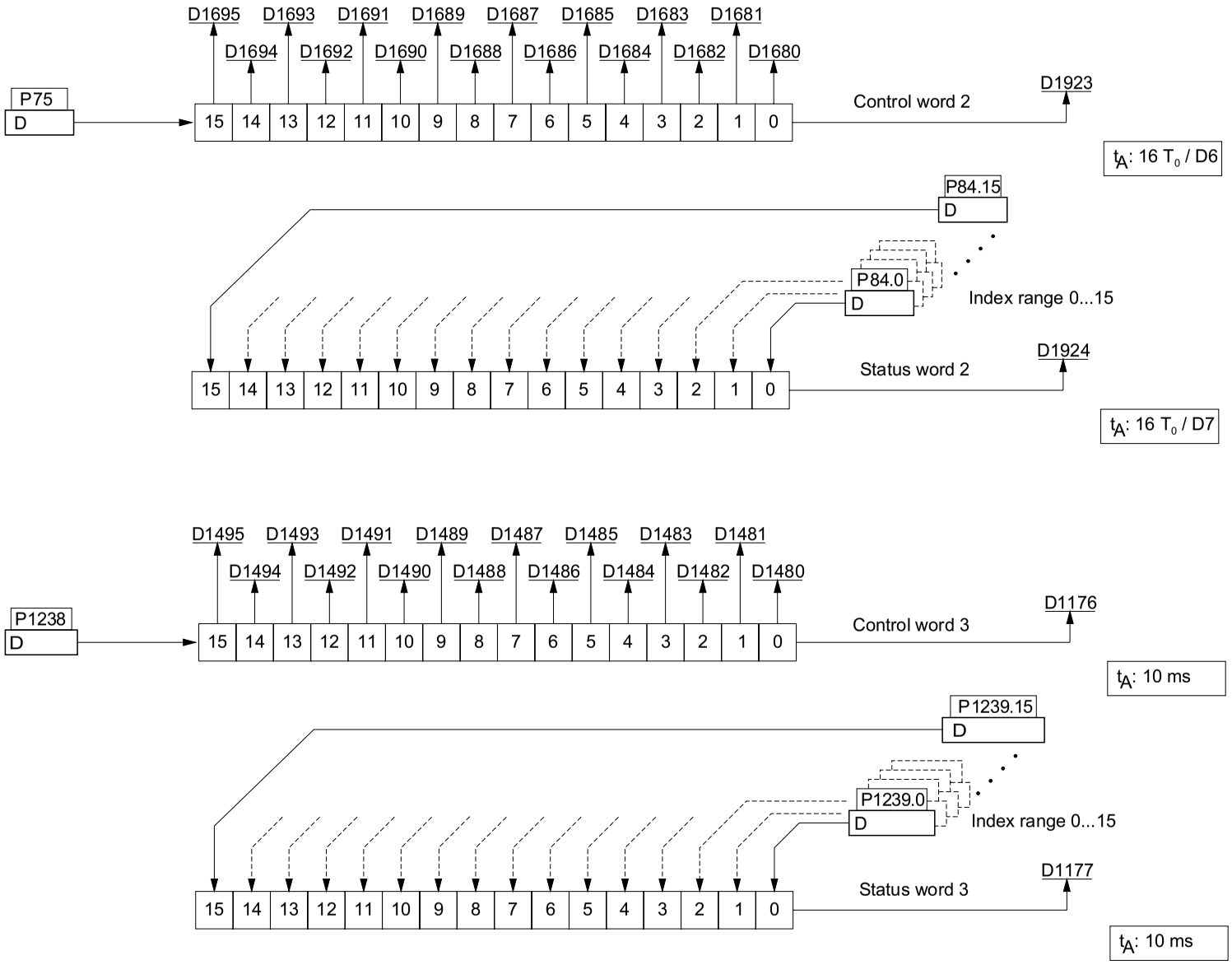
Note
More detailed information about the control/status logic is available in the control and status word flow diagram, function chart Sheets 44 and 45.



t_A: 10 ms

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Status word 1	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **03**



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Control and Status word 2 and 3	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **04**

Changing-over the motor parameter set

For REFU*drive 500* converters, you can enter the data for two different motors. In the standard setting, the same values are set for both motors and motor 0 is selected. All of the motor-specific data in the drive converter are changed-over using the “Motor parameter set” control signal.
The “Motor parameter set” control signal has either a value of 0 or 1, and is set using P70. The default value of P70 is D1700 (constant, logical 0). This selects motor 0 with the associated data. To select motor 1, set D1701 in P70. You can control the selection of motor 0 and 1 from a digital input. If, for example, you wish to use digital input 3, then set D1716 in P70. If a low signal is now connected at digital input 3, motor data 0 is selected; correspondingly, with a high signal, motor data 1.
The changeover of “Parameter set” control signal is inhibited with the operating enable. It is **not** possible to changeover the parameter set in operation.
All of the motor model data are re-calculated as a result of the changeover.

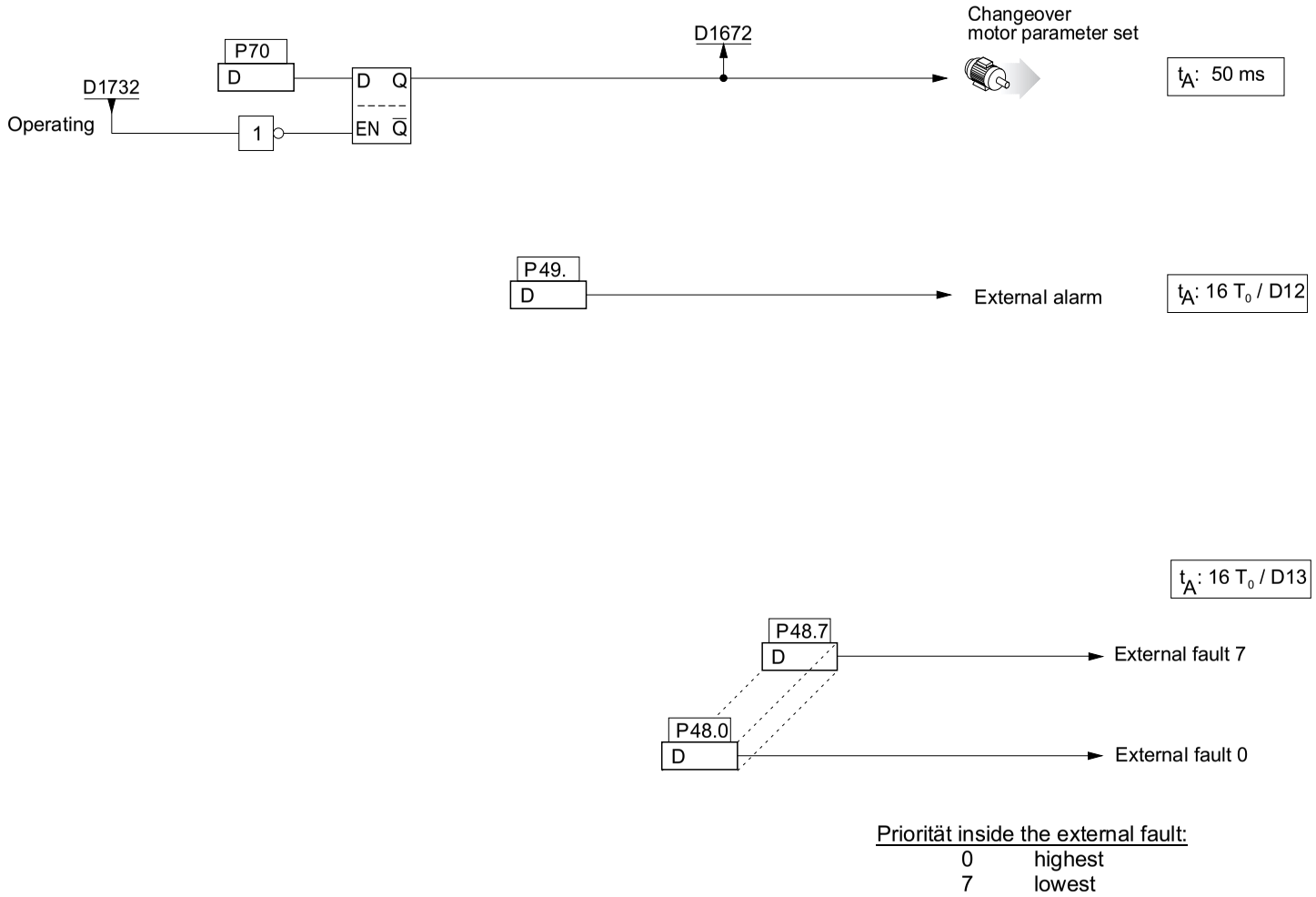
The following motor parameters have 2 index levels, and are involved with a motor changeover:

P130 ... P133	Encoder data, function chart Sheet No. 11 - 15
P390, P395	Speed normalization and monitoring, function chart Sheet No. 16
P367, P370, P373, P372	Torque limits
P374	Current normalization, function chart Sheet No. 20
P100...P129, P135...P148	Motor data and closed-loop motor control, function chart Sheet No. 21

Selecting index parameters using the “Changeover motor parameter set” control signal

In the function charts, only the symbols of the “Changeover motor parameter set” control signal are used:

If the “Changeover motor parameter set” control signal has a value of 1, then appropriately, the index level 1 of all of the parameters specified above, is selected and become effective in the drive converter.



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Unit control functions	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **05**

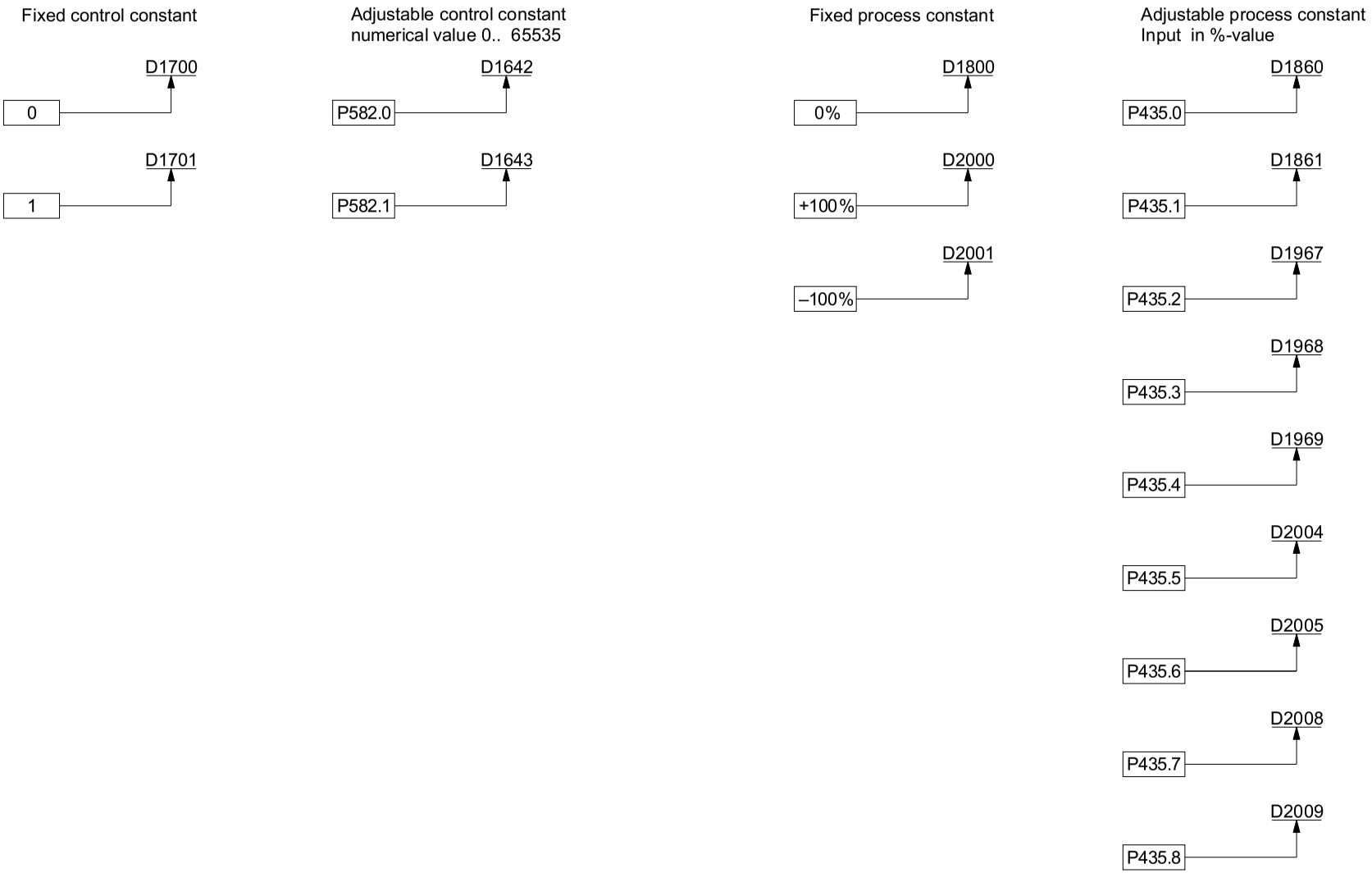
Selectable control constants

A direct numerical value, 0 ... 65536 is entered.
If possibly connected as process data, it is interpreted in the generally used % normalization; in all other cases as numerical value.

100	% =	16384
199.99	% =	32767
- 199.99	% =	32768
- 100	% =	49152

Selectable process constants

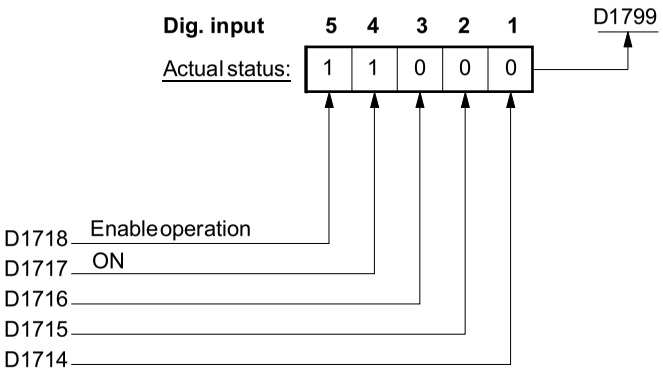
% values are directly entered.


Fixed control constant
D1700
0
D1701
1
Adjustable control constant
numerical value 0.. 65535
D1642
P582.0
D1643
P582.1
Fixed process constant
D1800
0%
D2000
+100%
D2001
–100%
Adjustable process constant
Input in %-value
D1860
P435.0
D1861
P435.1
D1967
P435.2
D1968
P435.3
D1969
P435.4
D2004
P435.5
D2005
P435.6
D2008
P435.7
D2009
P435.8

Group display parameter D1799

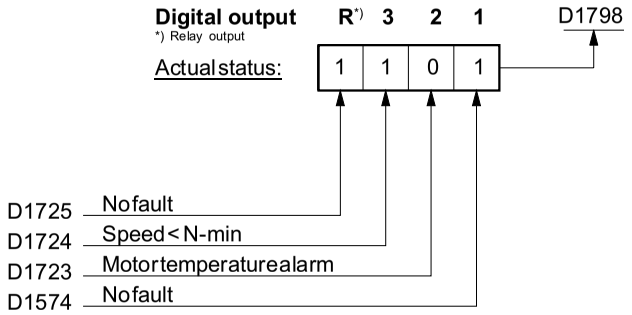
The status (condition 0 or 1) of all digital inputs can be simultaneously displayed on the operator panel monitor using the group display parameter D1799.
Example: The digital inputs are assigned typical functions.

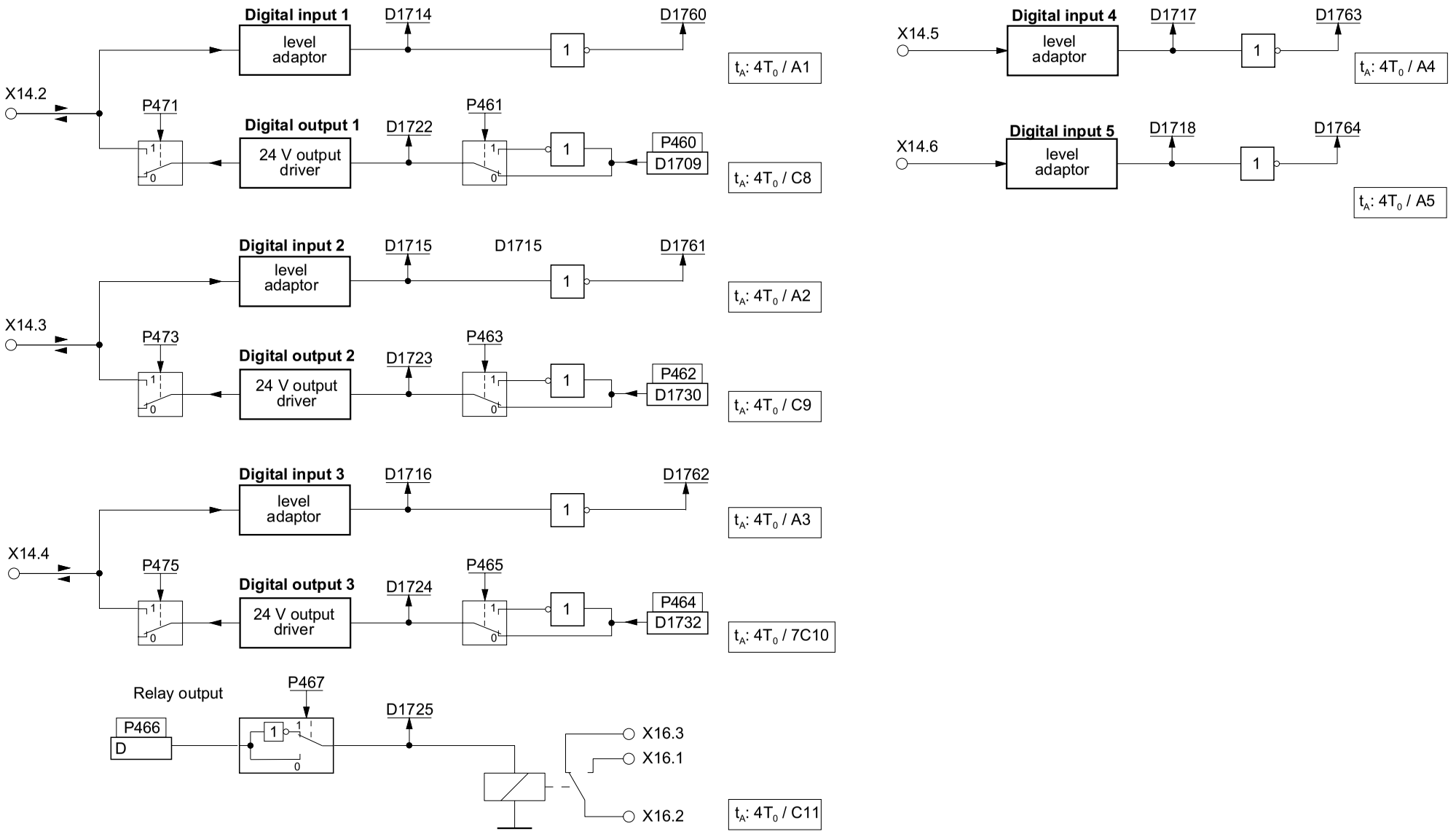
Group display parameter D1798



The status (condition 0 or 1) of the 3 digital outputs and teh relay outputs can be simultaneously displayed on the operator panel monitor using the group display parameter D1798

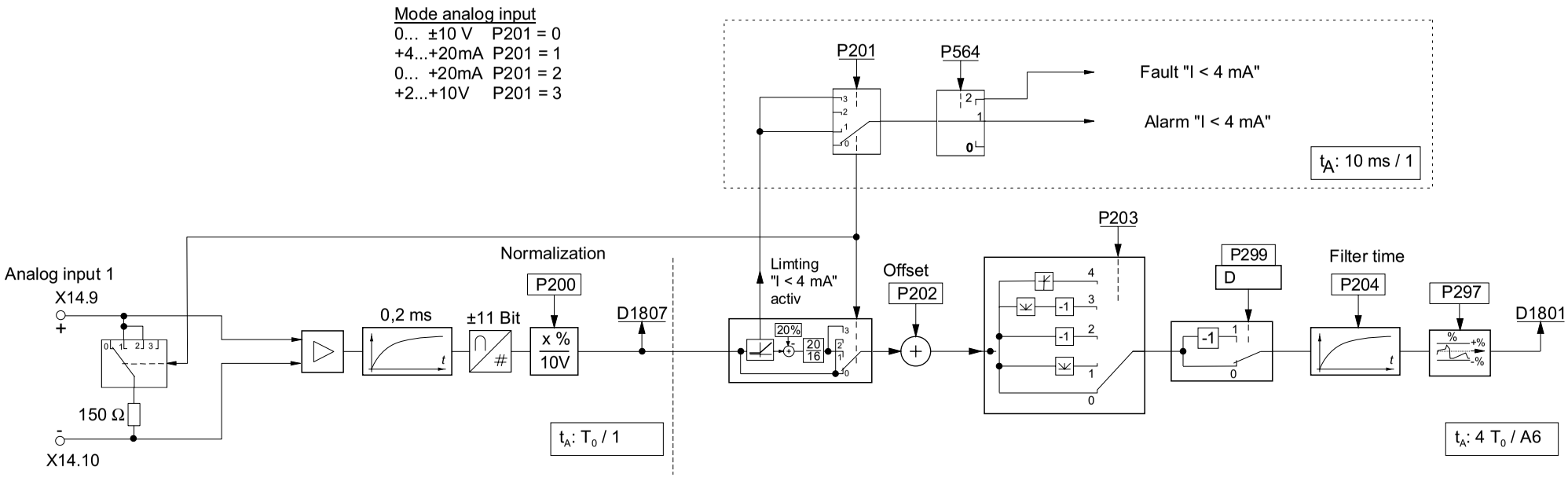
Example: The digital outputs are assigned typical functions.





1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Digital inputs, digital outputs	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **07**



1	2	3	4	5	6	7	8

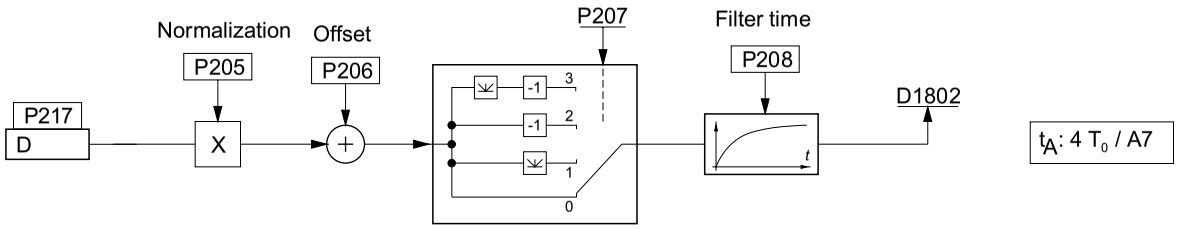
Function diagram **REFUdrive 500 - RD52** Analog input (standard)	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **08**

Rexroth Indramat

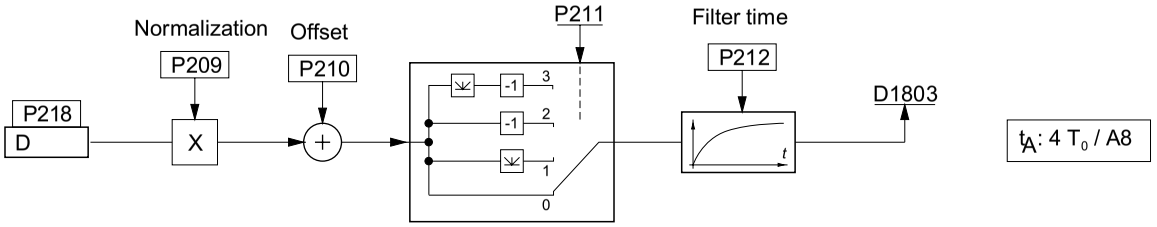
Input blocks

The firmware has three input blocks to condition the process value signals. If the option is used (extended terminal strip), an input block is preferably used to condition analog input D1806.

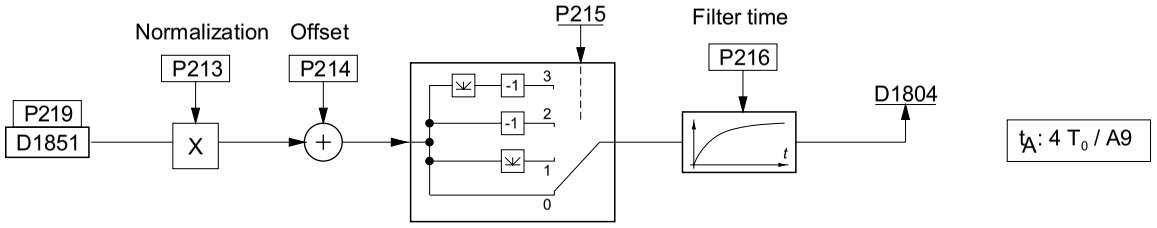
Input block 1



Input block 2



Input block 3



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Input blocks	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **09**

Output blocks

The firmware contains 2 output blocks for signal conditioning, which are processed in the 16T0 time sector. These are preferably used to condition signals for the analog outputs, option RZP01.1-T1 (extended control terminal strip, KL17037).

Note

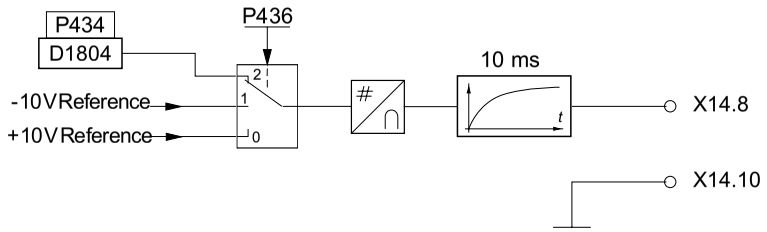
The outputs of output blocks 2 and 3, D1120 and D1121 must be switched to the extended control terminal strip KL17037 via the process data interface, refer to function chart 49, “Process data interface SI4”.

If an output block is not used for an additional analog output, it can be used to process signals of other process values.

Analog output normalization

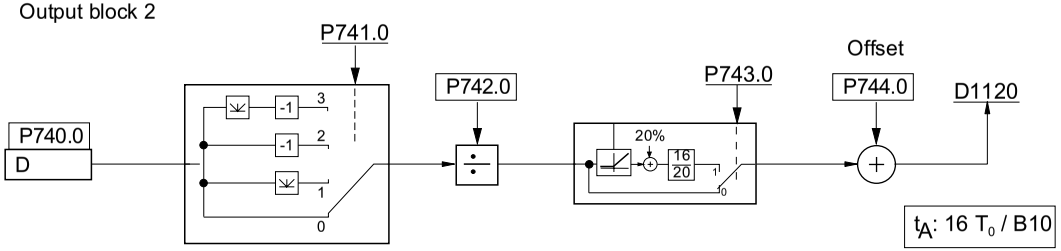
100.00 % = 10 V at the analog output

Analog output



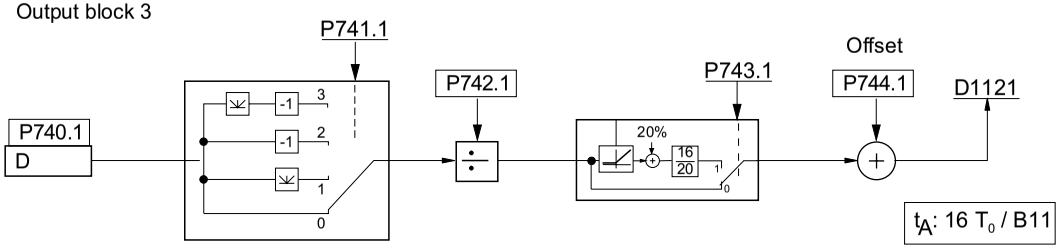
t_A: 1 ms

Output block 2



t_A: 16 T_0 / B10

Output block 3



t_A: 16 T_0 / B11

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Analog output	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **10**

Service interface definition

The service interface is the standard serial RS232 interface integrated in the drive converter (X11 on the SR 17002).

Processing the process data of the service interface

The process data, received via the service interface, are converted into display parameters in the drive converter. These can be connected to the variable parameter sources for controlling the unit.

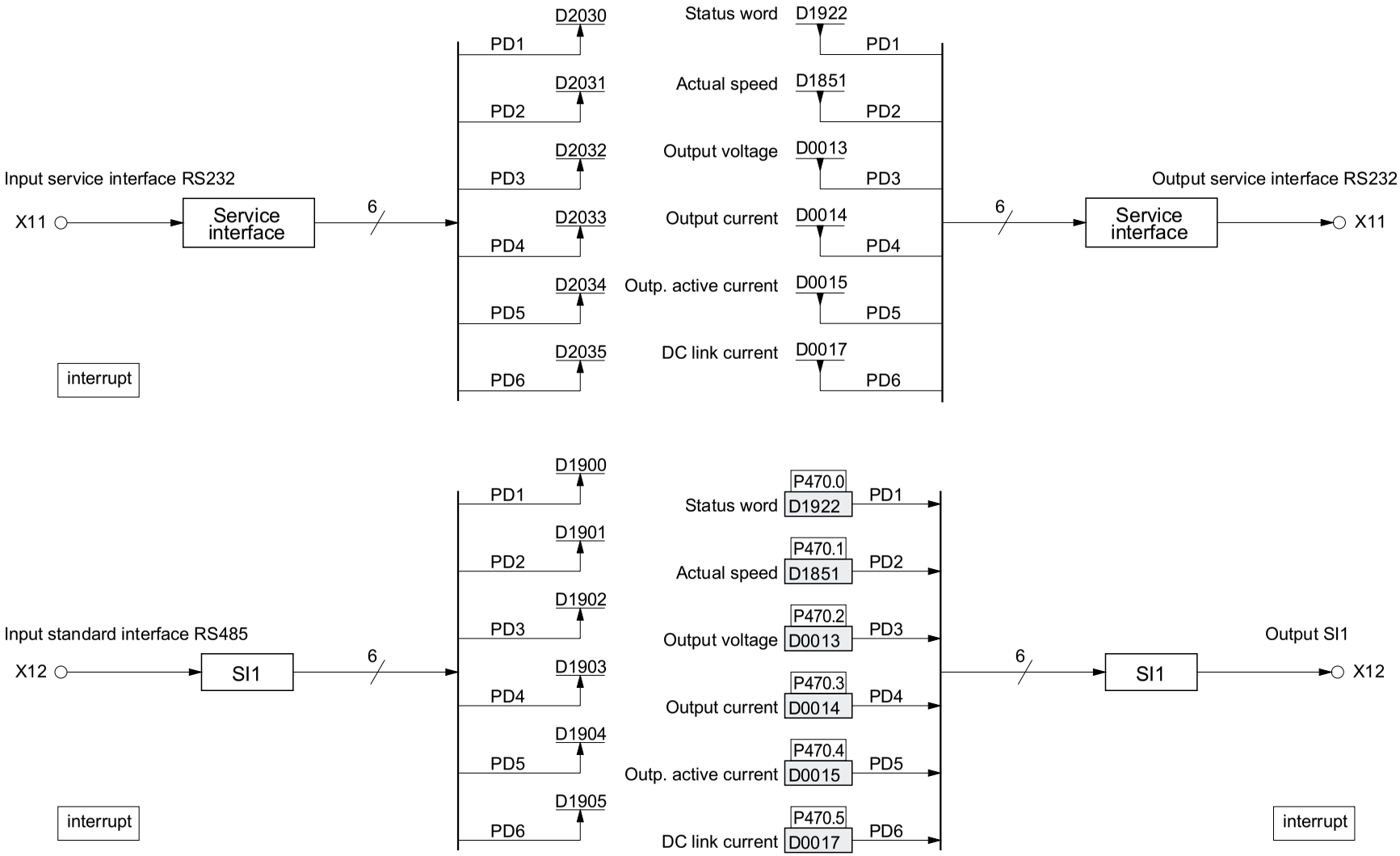
SI1 definition

SI1 is the standard RS485 serial interface integrated in the drive converter (X12 on SR 17002).

Processing the process data SI1

The process data, received via the SI1 are converted into display parameters in the drive converter. They can be freely connected to the variable parameter sources to control the unit.
The drive converter sends its actual values as process data via the SI1, by connecting D parameters to the variable parameter sources for output SI1.

When operating REFUwin via the SI1 with RS232 -> RS485 interface converter with automatic three-state control, we recommend that the standard parameterization is used. This guarantees that the status and actual value display operates correctly in the “Operator control and visualization” menu.



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Process data, stadard interfaces	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **11**

Process data interface SI6 (CANpur)

The SR17002 module has at connector X13 a CAN interface, which can couple 2 RD500 units. This standard CAN interface is exclusively used for process data transfer. Up to 12 process data can be sent and received. A CAN protocol contains 4 process data so that 3 send and 3 receive protocols (identifiers) can be configured. The circulating rate of the send protocols can be specified in a time grid of 1 msec, whereby the shortest circulating rate of 3 protocols is 4 msec. If only 2 send protocols are active, the shortest circulating rate is 2 msec, and if only one protocol is active, 1 msec.

P1270 Baud rate, standard CAN (125 kbaud .... 1 Mbaud)

P1271 [0...2] Identifier, send protocols
Index 0: PZD 1...4
Index 1: PZD 5...8
Index 2: PZD 19...12

P1272 [0...2] Identifier, receive protocols
Index 0: PZD 1...4
Index 1: PZD 5...8
Index 2: PZD 19...12

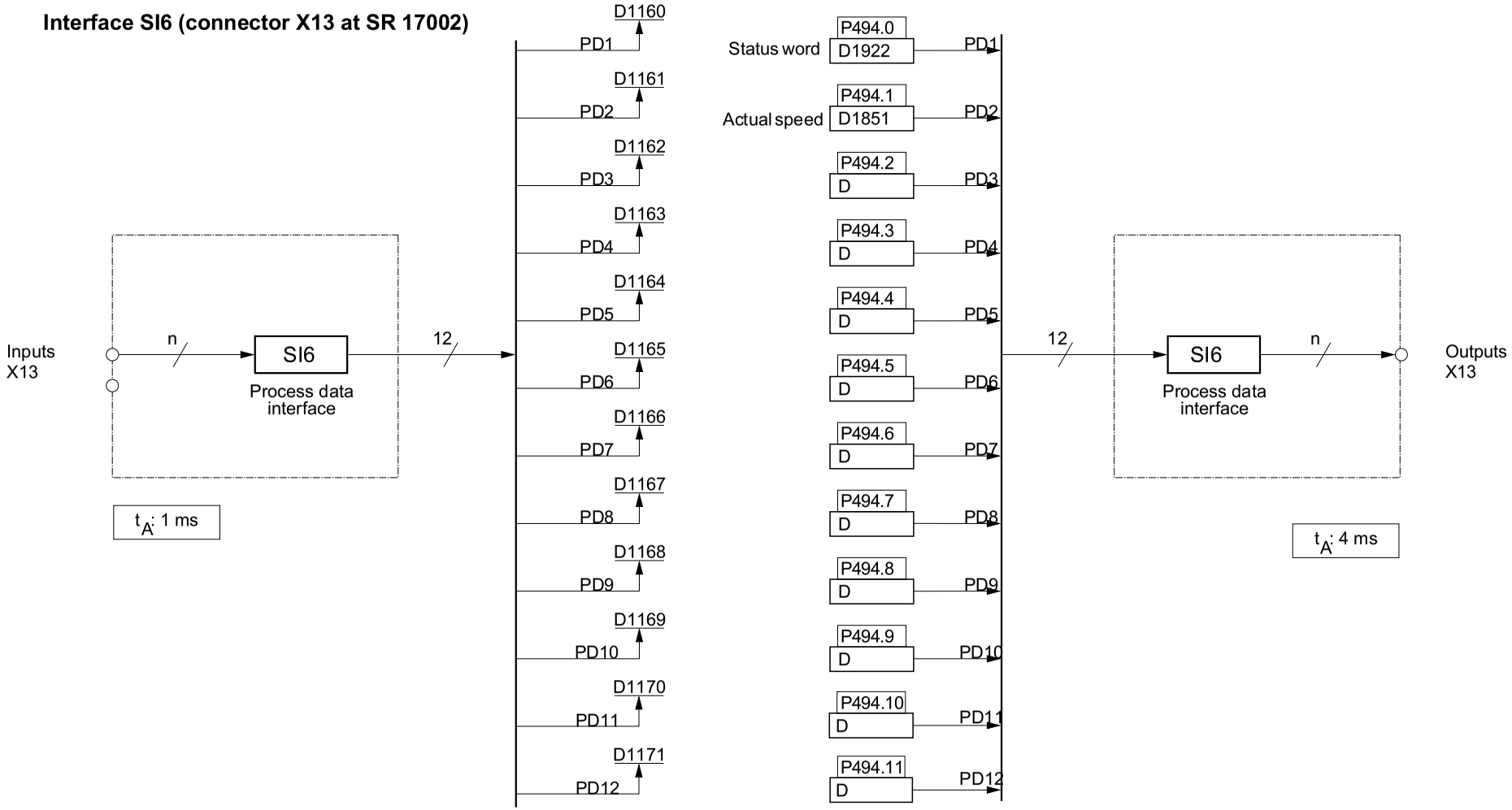
P1273 [0...2] Clock rate, send protocols (units, 1 msec)
Special functions:
0 = cyclic data not sent, protocol not active
254 = sender starts after receive protocol
255 = reserved
Index 0: PZD 1...4
Index 1: PZD 5...8
Index 2: PZD 19...12

P1274 SI& Rx monitoring function [interface&Rx]
0 = no action
1 = warning
2 = fault

P1275 SI6 Rx monitoring time (units, 0.01 sec)

P1276 Source parameter for switch: Rx monitoring off

Interface SI6 (connector X13 at SR 17002)

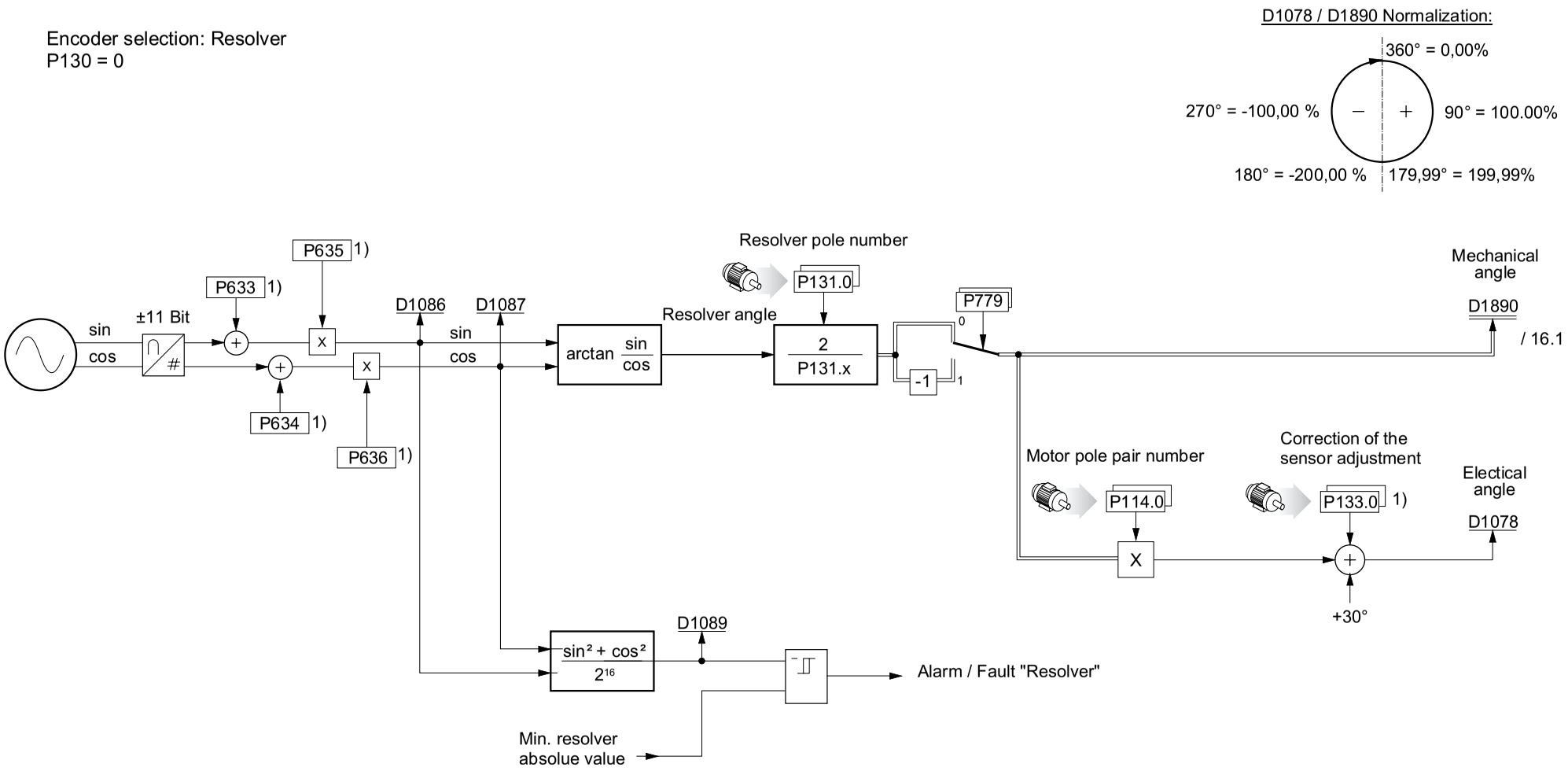


1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Process data, interface SI6	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **12**

Note
The standard resolver adjustment is for Siemens 1FT6 motors. For other adjustments, this can be corrected using P133.

Encoder selection: Resolver
P130 = 0



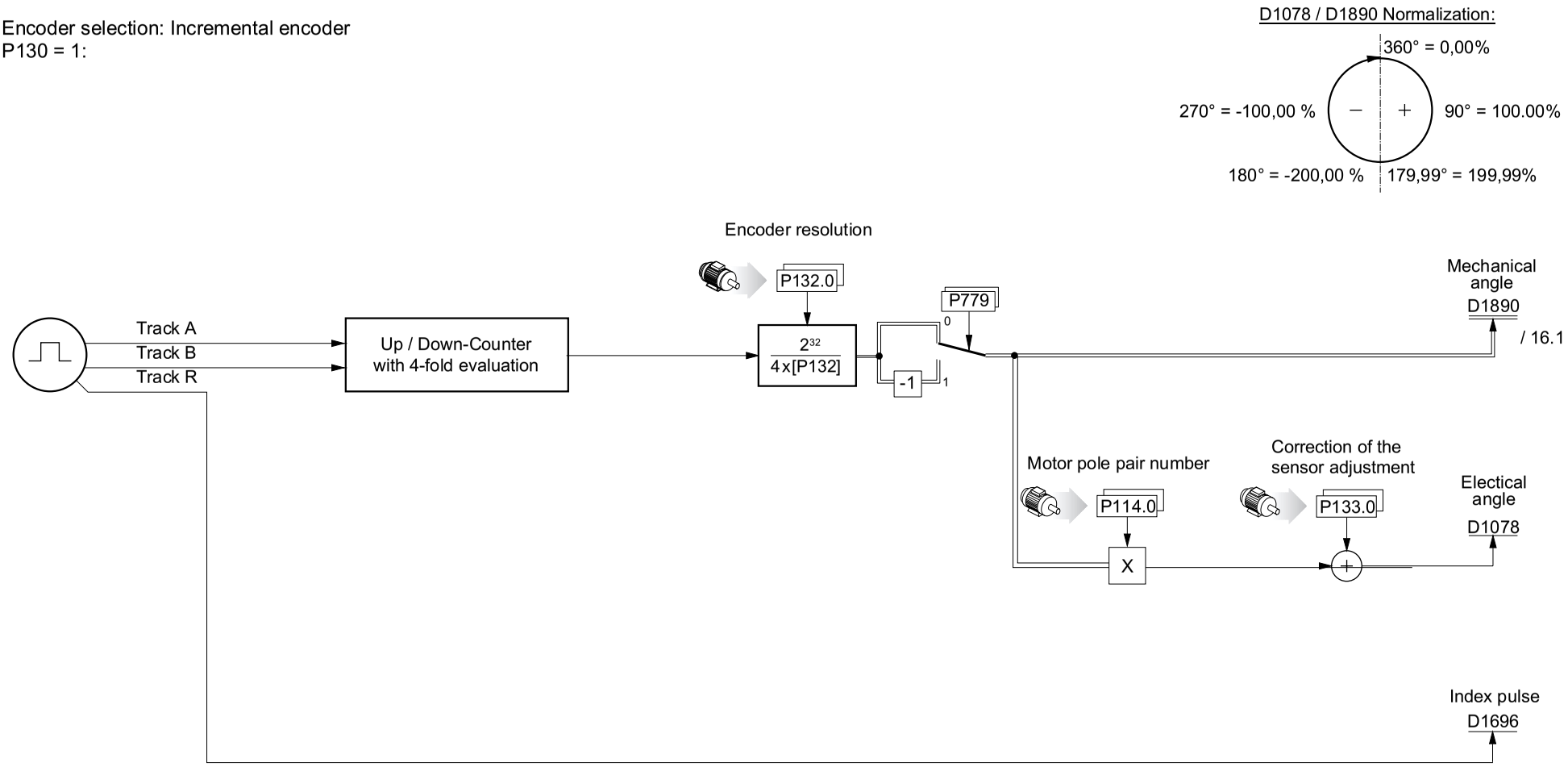
1) This parameters ar modified by the encoder optimize (P0189=3).

t_A: T_0 / 2

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Resolver evaluation	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **13**

Encoder selection: Incremental encoder
P130 = 1:

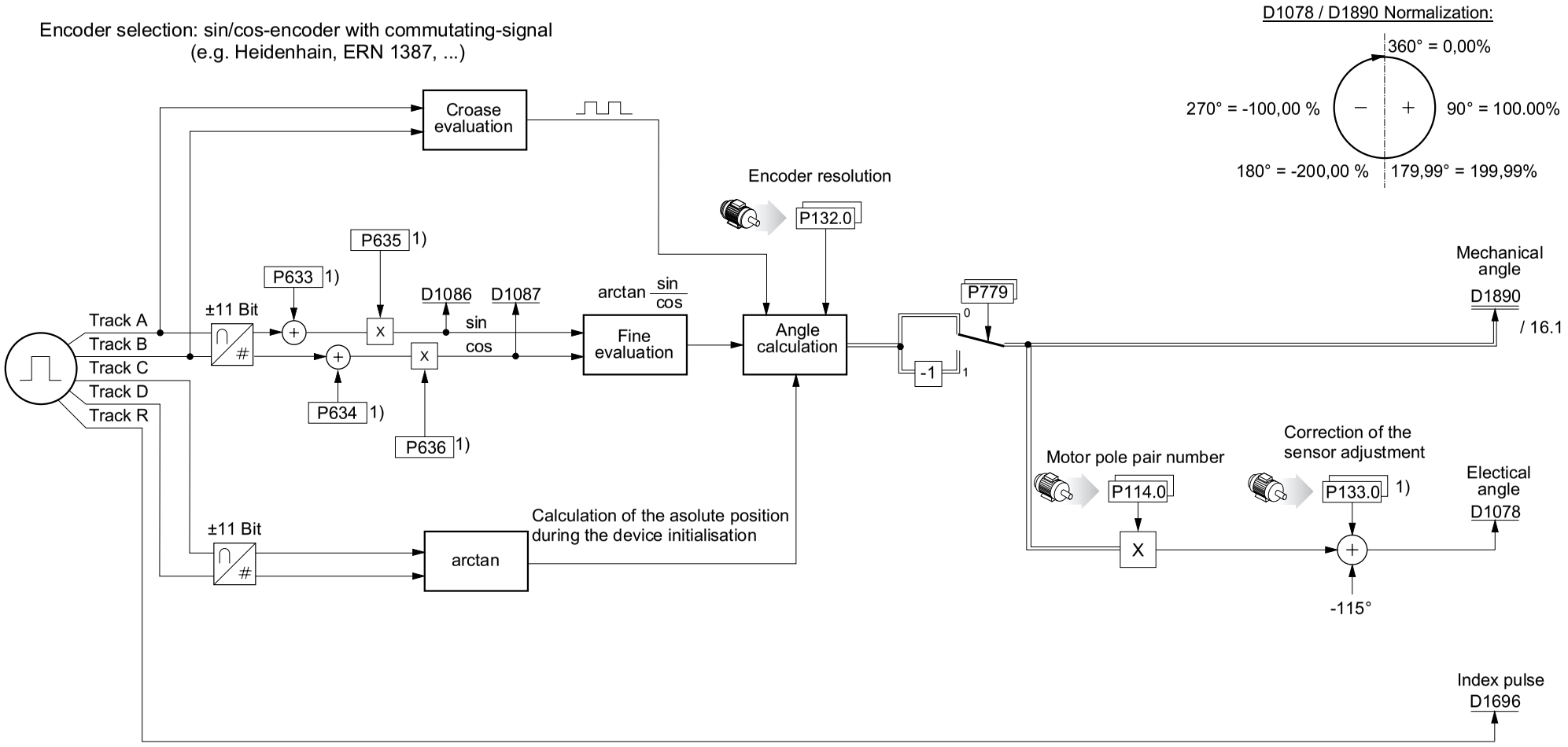


1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Incremental encoder evaluation	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **14**

Note
The standard ERN1387 encoder adjustment refers to Siemens 1FT6 motors. For other adjustments, this can be corrected using P133.

Encoder selection: sin/cos-encoder with commutating-signal
(e.g. Heidenhain, ERN 1387, ...)



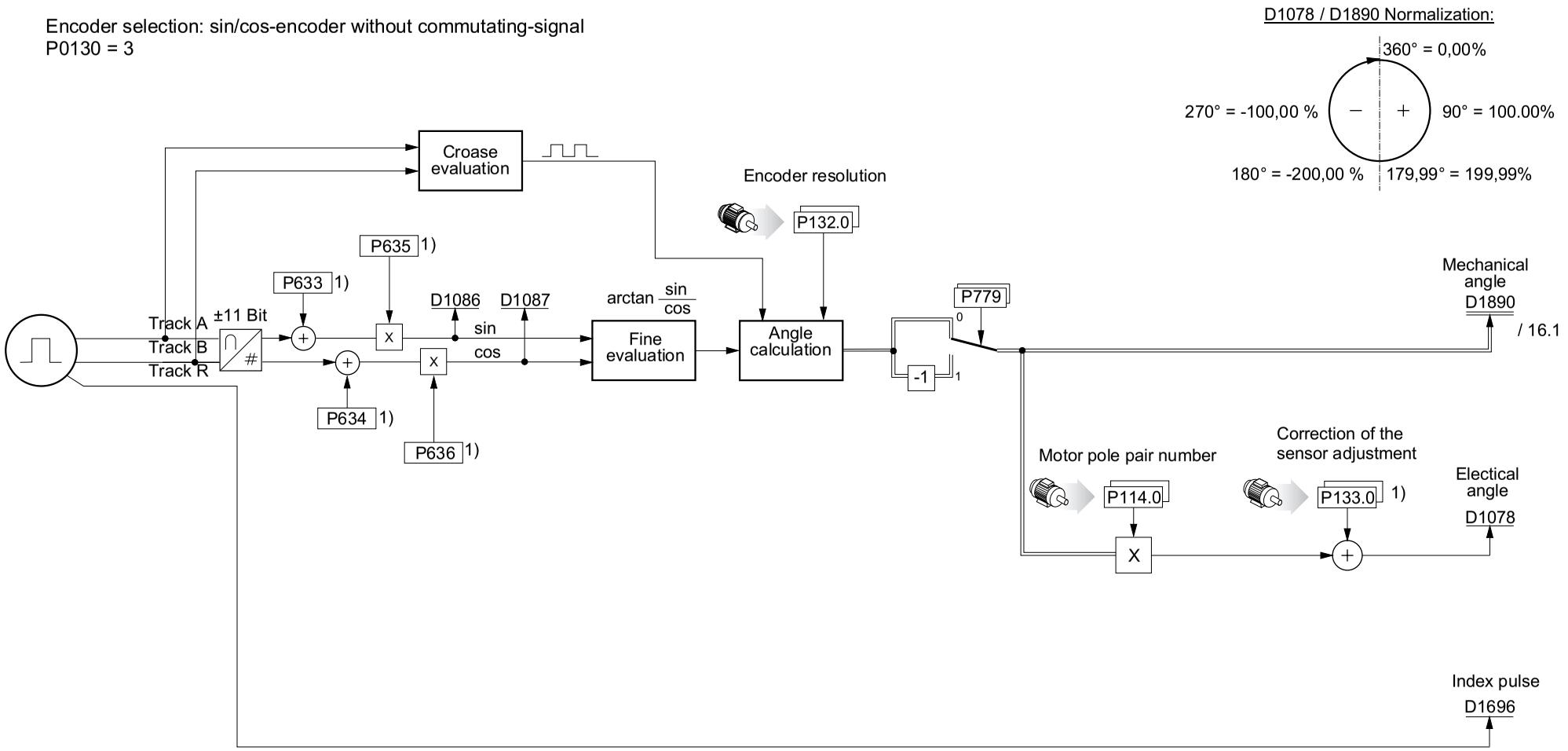
1) This parameters ar modified by the encoder optimize (P0189=3).

t_A: T_0 / 2

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Sin/cos&commutation - encoder evaluation	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **15**

Encoder selection: sin/cos-encoder without commutating-signal
P0130 = 3



1) This parameters ar modified by the encoder optimize (P0189=3).

t_A: T_0 / 2

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Sin/cos encoder evaluation	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **16**

For encoderless operation, the structure of the complete control (closed-loop) is kept. Speed estimation replaces speed measurements using an encoder. The speed estimation function includes a monitor, based on a model of an induction or synchronous motor. This monitor uses motor currents and fluxes to predict the current at the next closed-loop control clock cycle. The deviations between the measured and predicted currents are fed to an identification controller, which defines the speed. The identification controller (PI controller) is set using P774 and P775. The monitor is adjusted using P773. The parameters are available for every motor parameter set. (index 0 and 1).

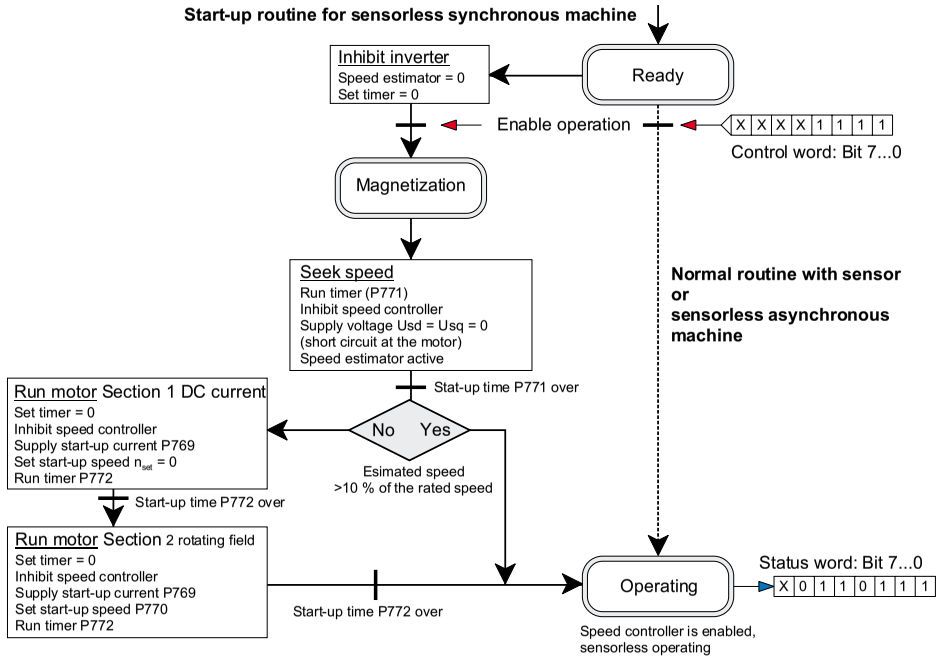
Commissioning induction motors

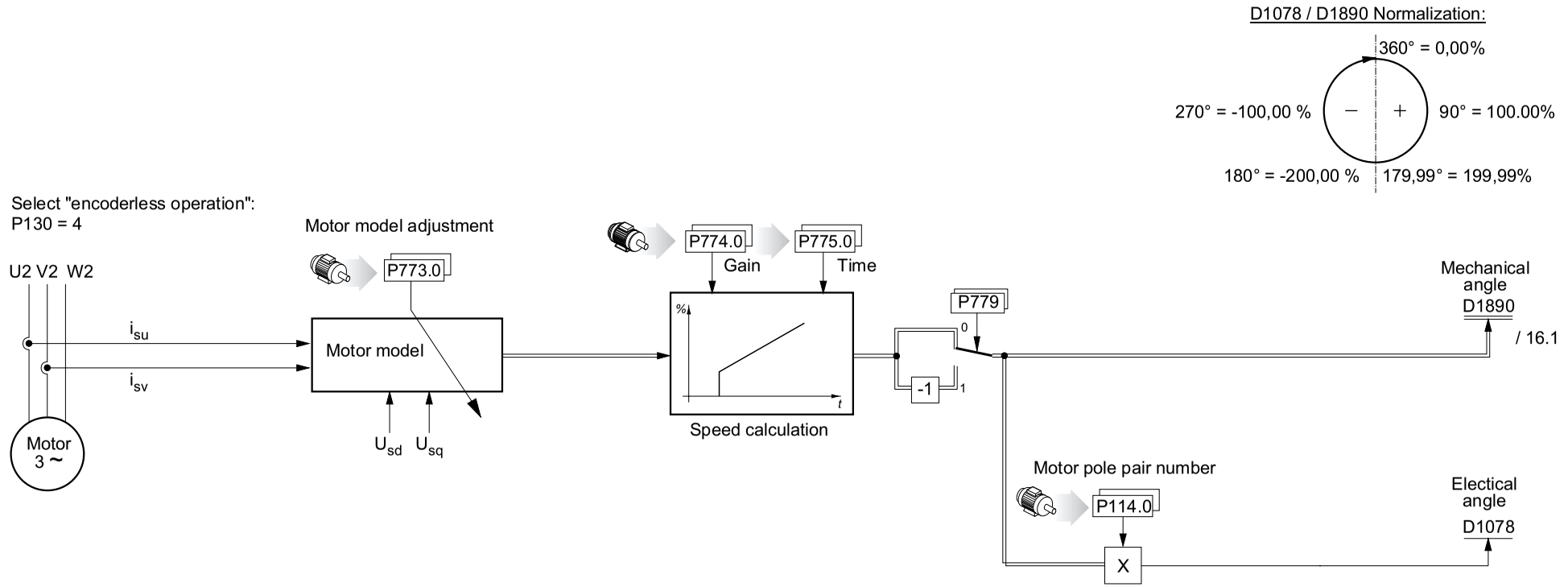
1. General settings:
   Conservatively set the speed controller (P335, P336), do not use excessively fast up and down ramps (P280, P282).
   P147 (current controller), set the dynamic performance to “extremely high”.
   P148 = 100 %
   P149 = 0
   Set Tn of the speed controller (P336/P338) to a value ≥ 5 x P775.
2. Enter a start value:
   P774 Kp speed estimation 3 %
   P775 Tn speed estimation 10 ms
   P773 k speed monitor 1.0
3. Change P774 (Kp speed estimation) until the speed estimation function operates correctly. The speed signal under no-load conditions should not exhibit any higher oscillations (test with approx. 0.2 .. 0.5 of the rated speed).
4. Change P775 (Tn speed estimation), until speed changes are cleanly sensed.
5. If required, modify P773 (k speed monitor), between 0.5 and 1.5 until stable operation is possible, otherwise keep the standard value of 1.0.

Commissioning synchronous motors

1. General settings:
   Conservatively set the speed controller, do not use excessively fast up and down ramps.
   Set P147 (current controller) set the dynamic performance to “extremely high”.
2. Enter a starting value:
   P774 Kp speed estimation 3 %
   P775 and P773 are of no significance for synchronous motors, and can be left at the selected values. The setting is realized exclusively via P774. This specifies the identification controller gain to estimate the pole wheel angle.
3. Change P774 (Kp speed estimation) until the speed estimation function runs correctly. The speed signal under no-load conditions should not exhibit any significant oscillations

A starting routine is executed in the standard setting where a fixed frequency (P770) and a specified current (P769) is impressed in the synchronous motor. P771 and P772 must be set to 0 s if a starting routine is not required.





1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Encoderless operation	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheed No. **17**

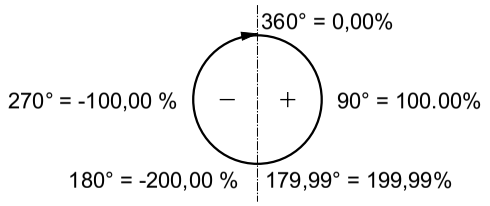
The “External encoder” setting is provided for the following functions:

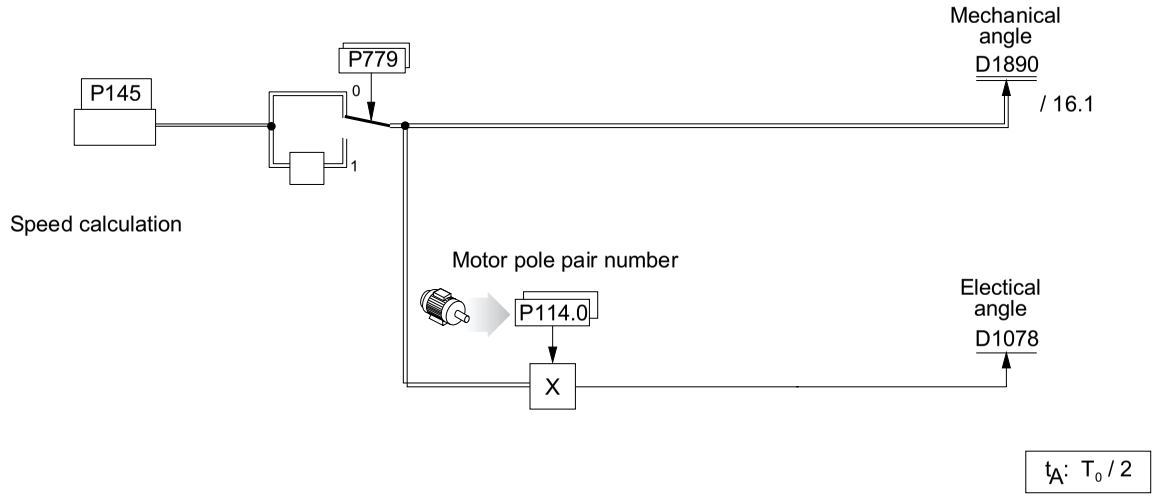
1. Encoder evaluation via the RZP01.1-G2 option card:
   The option G2 determines the encoder angle on the first two processor channels from SI2 and SI4. P0145 is connected to the first process channel, i.e. if the RZP01.1-G2 encoder card is inserted in module location 1, P0145 =1910 is correct; if the RZP01.1-G2 encoder card is inserted at module location 2, P0145 = 1100.

2. Encoder evaluation via SynchroLink:
   The SynchroLink option transfers the encoder angle of an adjacent unit. In this case, we recommend the first process channel of the SynchroLink, i.e. P0145 = D1130.

Encoder selection: external encoder
(P130 = 5)

D1078 / D1890 Normalization:

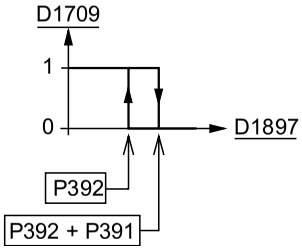


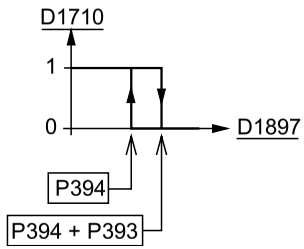


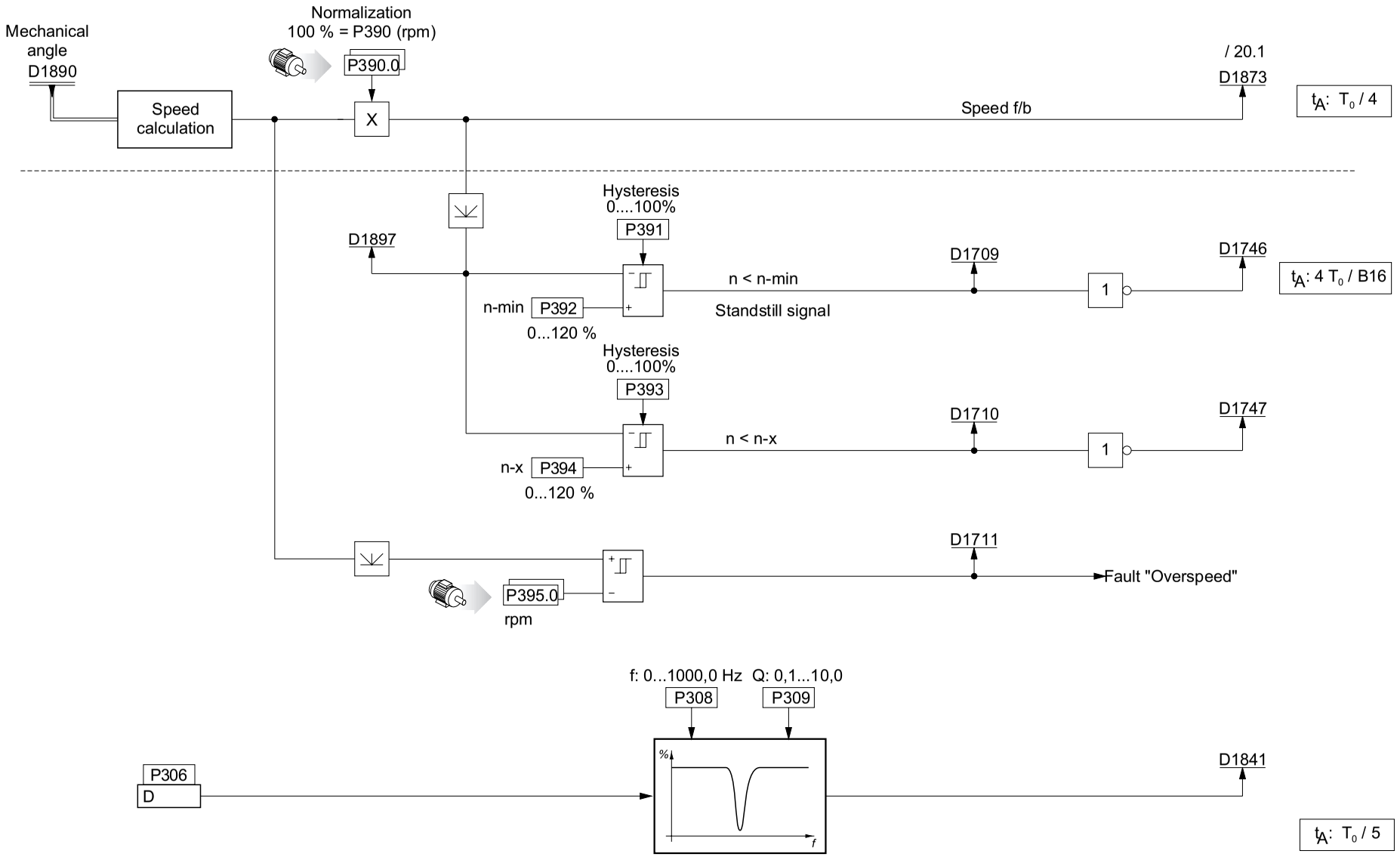
1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** External encoder	Rexroth Indramat	Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **18**

Switching diagrams of the comparators

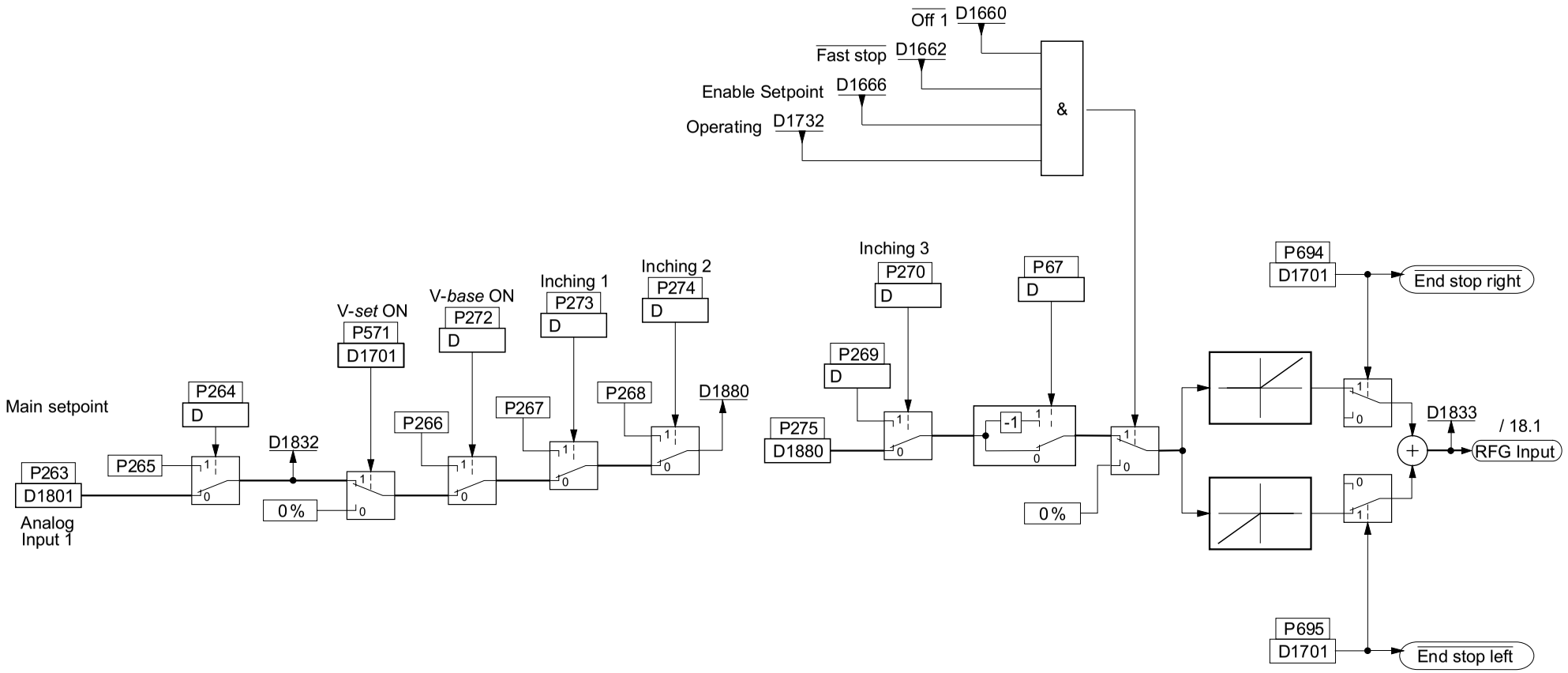






1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Speed evaluation, bandstop	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **19**



t_A: 4 T_0 / A11

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Setpoint generation	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **20**

Ramp-function generator (RFG)

Ramp-up time and ramp-down time: When defining the ramp-up and ramp-down time, any selected rounding-off times are not taken into account.
The ramp-up time is the time which the RFG output requires to move from 0% to 100% and for the ramp-down time, appropriately from 100% to 0%.
If there is rounding-off, the ramp-up and ramp-down time is obtained by extending the linear portion of the characteristic up to the 0% and 100% intersection points, refer to the adjacent drawing.

Rounding-off UP and DOWN: The rounding-off is defined as the time in which the output quantity, starting from a constant initial value, reaches the maximum acceleration value (phase 1). The rounding-off is also defined as the time in which the output quantity, starting from its maximum acceleration, reaches a constant final value (phase 3).
The ramp-up operation with rounding-off is sub-divided into three phases:

Phase 1:

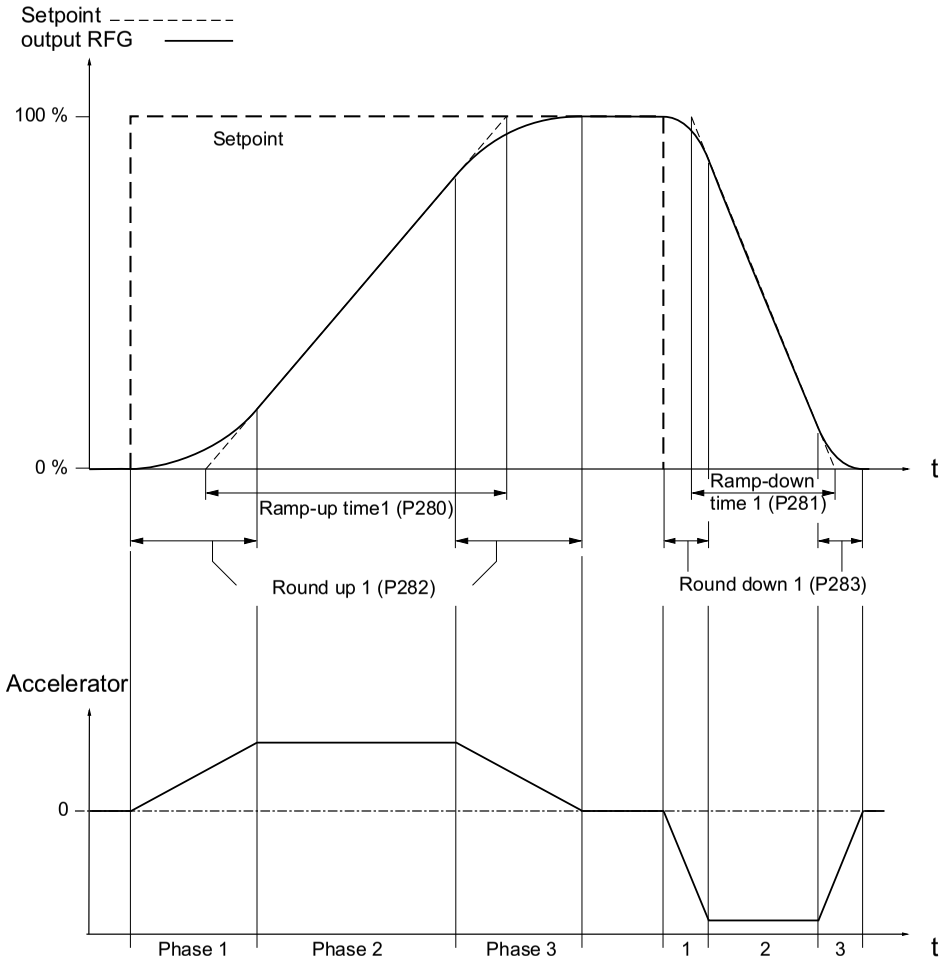
When the setpoint is increased, in the first phase the acceleration is increased proportional to time. In this rounding-off phase, the ramp-function generator output increases as the square of the time.

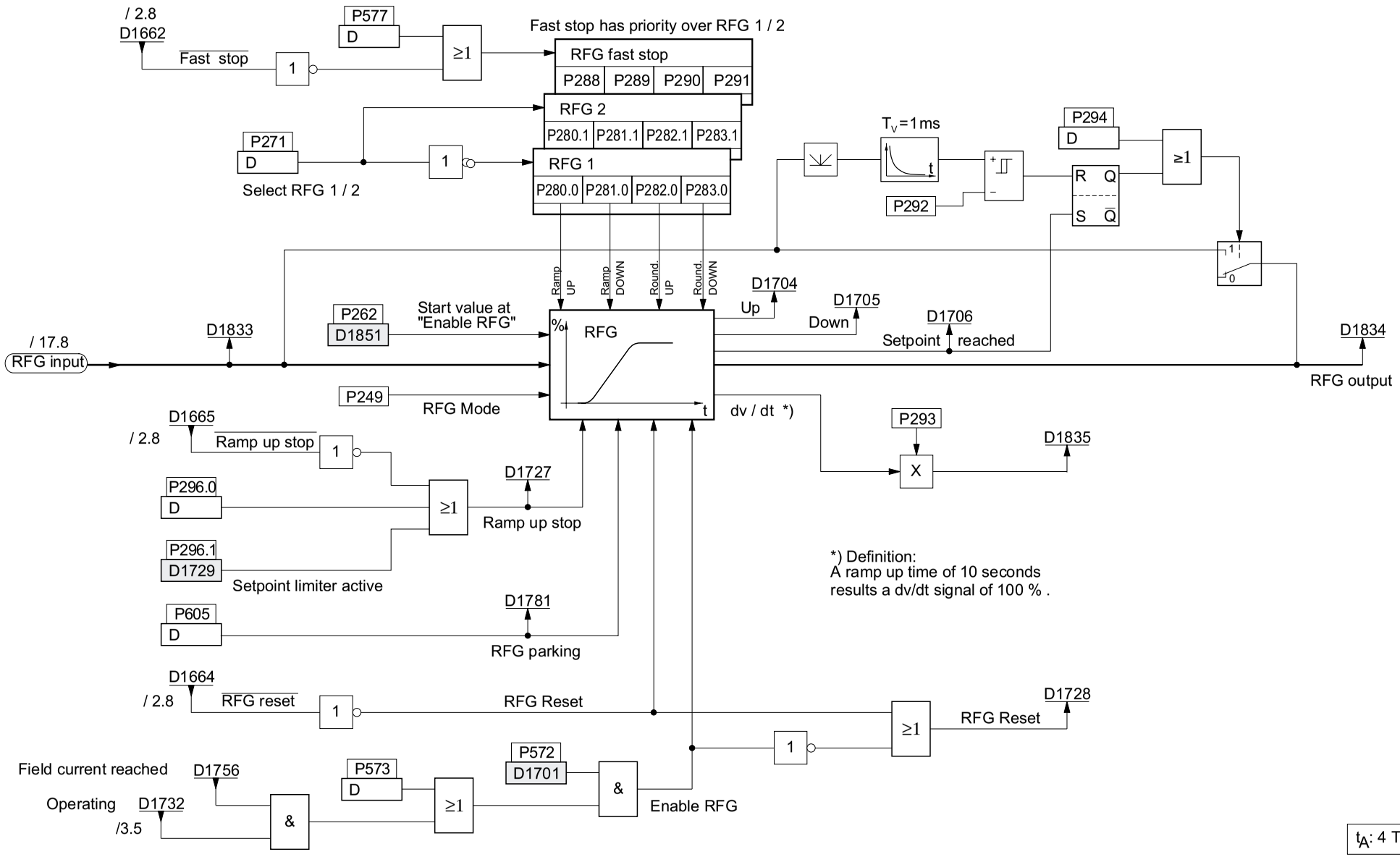
Phase 2:

After the maximum acceleration has been reached, corresponding to the entered ramp-up time, acceleration remains constant. The ramp-function generator output increases linearly with time.

Phase 3:

In the third phase, acceleration is reduced linearly with time. In this rounding-off phase, the ramp-function generator output approaches the final value as the square of the time (setpoint). The ramp-down operation behaves essentially the same as previously described.



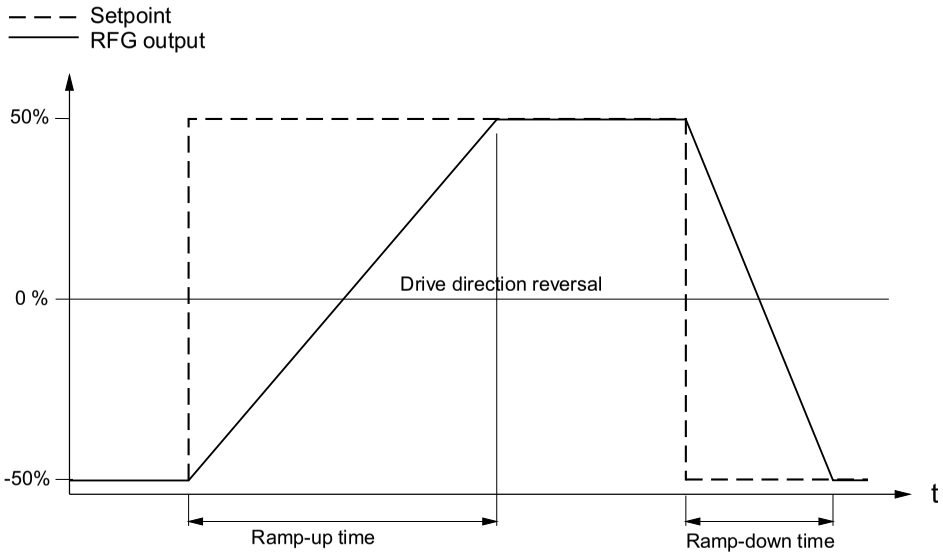


1	2	3	4	5	6	7	8

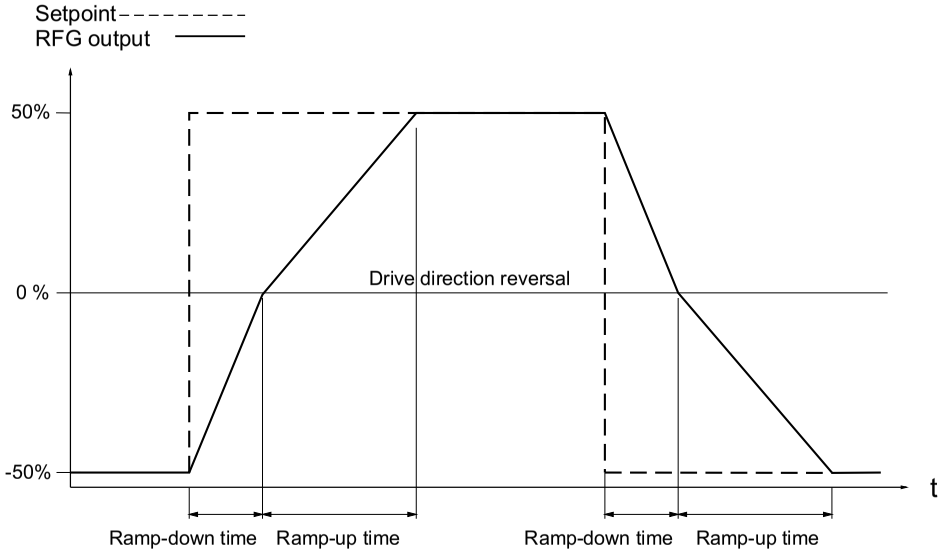
Function diagram **REFUdrive 500 - RD52** Ramp-function generator (RFG)	Rexroth Indramat	Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **21**

Ramp-up and ramp-down with direction of rotation reversal

RFG mode “M direction”: P249 = 0:
For arithmetical positive setpoint changes, the RFG UP times are effective, for arithmetic negative setpoint changes, the RFG DOWN times are effective.



RFG mode “speed direction”: P249 = 1:
For absolute setpoint increases, the RFG UP times are effective, for absolute setpoint decreases, the RFG DOWN times are effective.

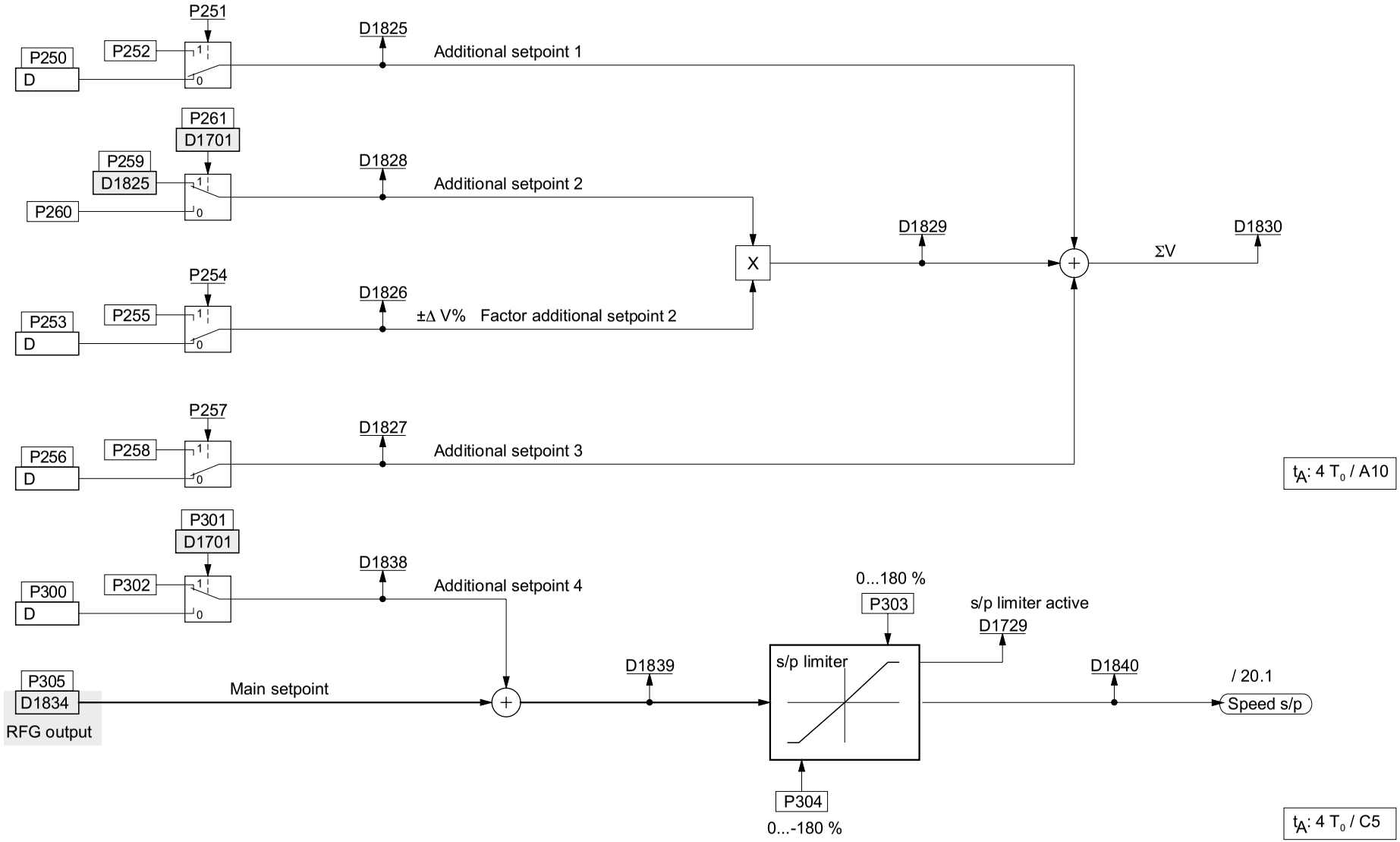


Ramp-up stop (1727)

The “Ramp-up stop” command holds the actual value at the ramp-function generator output, i.e. it no longer ramps-up to the setpoint applied.
However, the setpoint can ramp-down towards 0% at the ramp-function generator output.

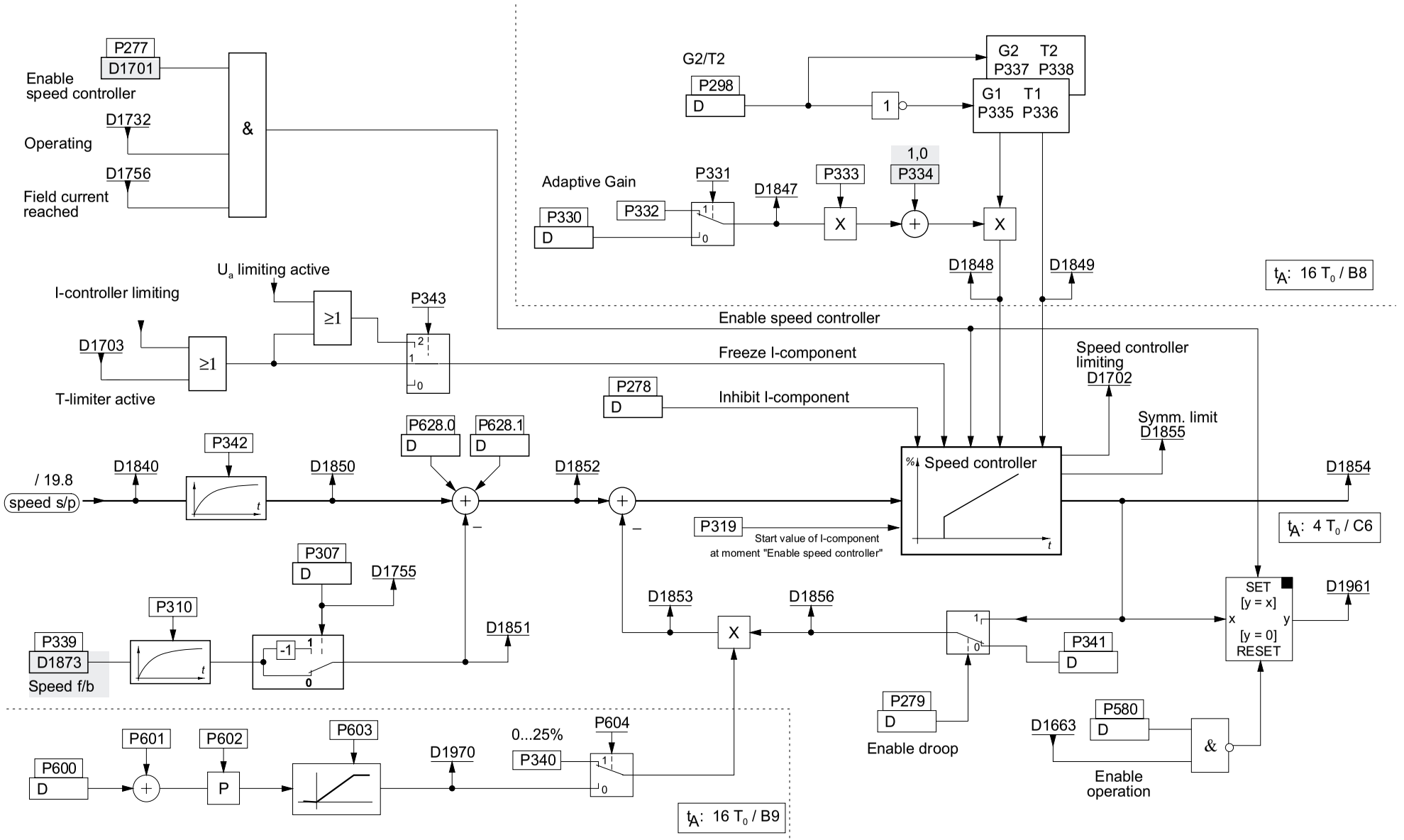
RFG park (1781)

The “RFG park” command holds the current value at the ramp-function generator output, i.e. it can *neither* be increased nor decreased as a result of a setpoint change.
Note: If the “RFG park” and “Off1” commands with braking are simultaneously active, the ramp-function generator does *not* return to zero, but maintains the actual value.



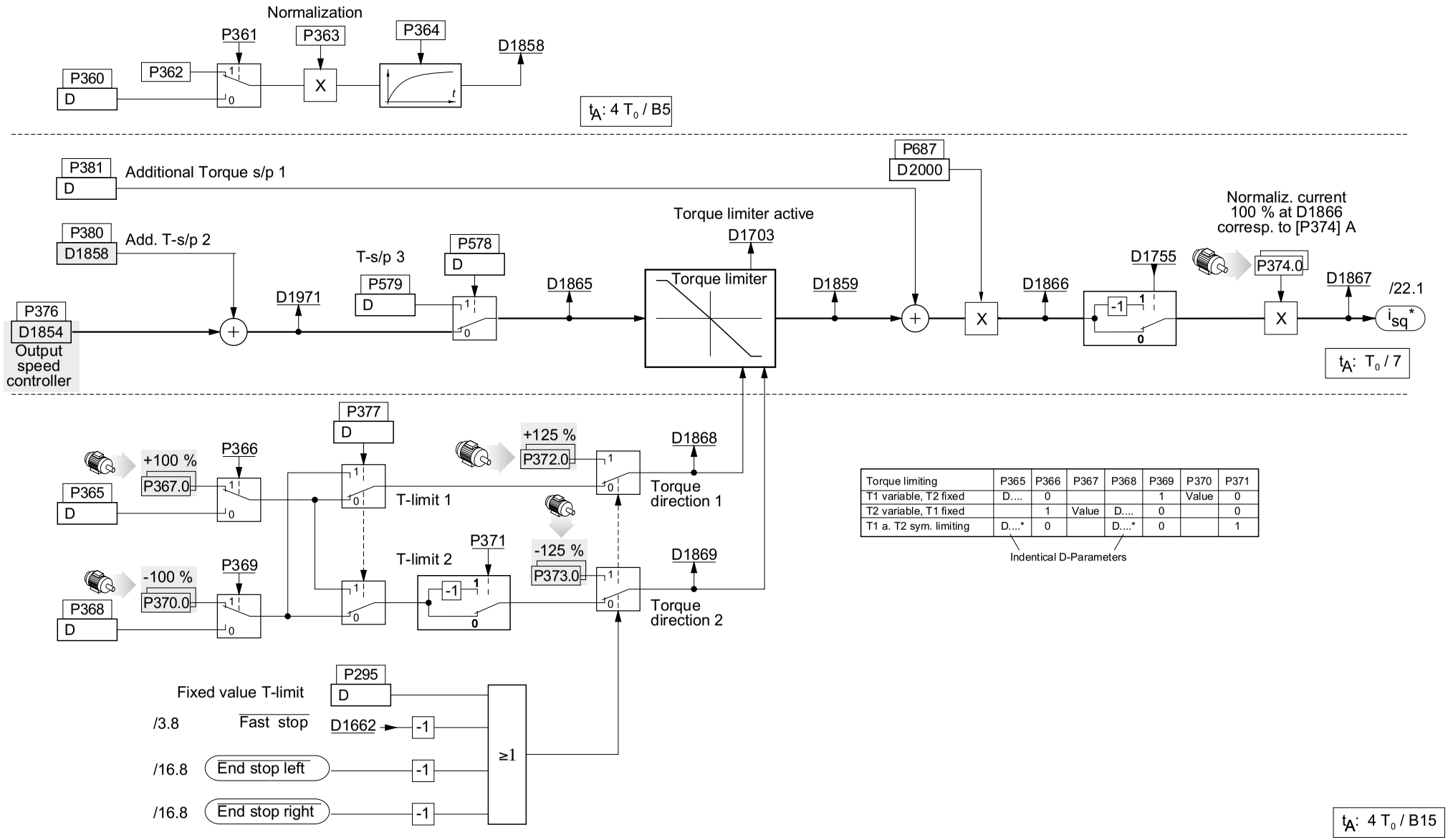
1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Supplementary setpoints, setpoint limiting	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **22**



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Speed controller	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **23**



Torque limiting	P365	P366	P367	P368	P369	P370	P371
T1 variable, T2 fixed	D....	0			1	Value	0
T2 variable, T1 fixed		1	Value	D....	0		0
T1 a. T2 sym. limiting	D....*	0		D....*	0		1

Indentical D-Parameters

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Torque limiting	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **24**

P109 Limiting (vector) the complete current; independent of all normalization factors, the maximum permissible current is entered here in A

P115 In field weakening, the coupling inductance L_m changes due to the lower magnetizing current. Thus, the gain factor of the torque-generating current i_{sq} to the torque changes. This parameter defines whether this parameter change should be compensated by an internal gain change. (the gain increases in field weakening).

Standard setting: With adaptation

P117 Indicates the internally calculated rated magnetizing current value (this can be subsequently changed).

P118 Indicates the internally calculated start of field weakening.

P119 Rated motor output

P120 Stator resistance for induction motors

P121 Leakage factor σ for induction motors

P122 Stator inductance of induction motors

P123 Indicates the rotor time constants T_r calculated from the rating plate data (this is only effective for induction motors).

P125, P126 For synchronous motors, allows the in-line and quadrature inductance to be separately entered (normally, this is internally calculated).

P128 Flux correction controller: This controller supports field-weakening operation by ensuring sufficient voltage reserve. Generally, this does not have to be changed, as the gain is internally calculated.

P129 Flux controller gain:

Standard value 50 % (flux is controlled with an internally calculated gain)

Special case 0 % (flux open-loop controlled). For open-loop controlled operation, the flux is established with delay according to an exponential function, duration approx. $3*T_r$. For closed-loop controlled operation, the flux is established with the maximum possible magnetizing current, duration approx. $1 \cdot T_r$

(this is only effective for induction motors).

P135- P143 Magnetizing characteristic $L_s = f(i)$ determined using the automatic motor identification (P189). The characteristic is referred to the value $L_s = f(0.4\ I_{rated})$. This reference value is saved in P122. Including the reference value in P122, the curve comprises 10 points ($L_s = f(0.1 I_n)$, $L_s = f(0.2\ I_n)$ ... $L_s = f(1.0\ I_n)$), between which, the characteristic is linearly interpolated.

P144 Allows the identification controller gain to be manually changed, which determines the rotor time constant T_r. Normally, this does not have to be changed, as the gain is automatically adapted to the motor.

Standard: 100%

Special case: 0% (disables the T_r adaptation)

(only effective for induction motors)

P147 This allows the current controller dynamic response to be increased or decreased. This changes torque rise times. Normally, this does not have to changed, as the gain is automatically adapted to the motor. However, it requires relatively precise information about the motor parameters. (e.g. from the automatic parameter identification routine.)

Settings P147 = extremely high (highest dynamic performance)
= high (average dynamic performance, standard)
= standard (standard dynamic performance)

P148 Is used to change the current controller gain. Generally this does not have to be changed, as the gain is automatically adapted to the motor.

Standard: 100%

P149 Selects from above which flux actual value torque can be output. For induction motors, torque can only be output, if the flux has been essentially established after the motor has been powered-up.

Standard: 75%

(only effective for induction motors)

P382 **Manual intervention, flux setpoint:** The quantity, entered via P382, is multiplied by the internal flux setpoint. The factory setting P382 = 2000 (100 %) results in the nominal setpoint.

P189 Allows the various operating modes to be selected:

Open-loop controlled operation with V/Hz characteristic from P181 – P188

Caution: This mode is only intended for test purposes and when commissioning the system.

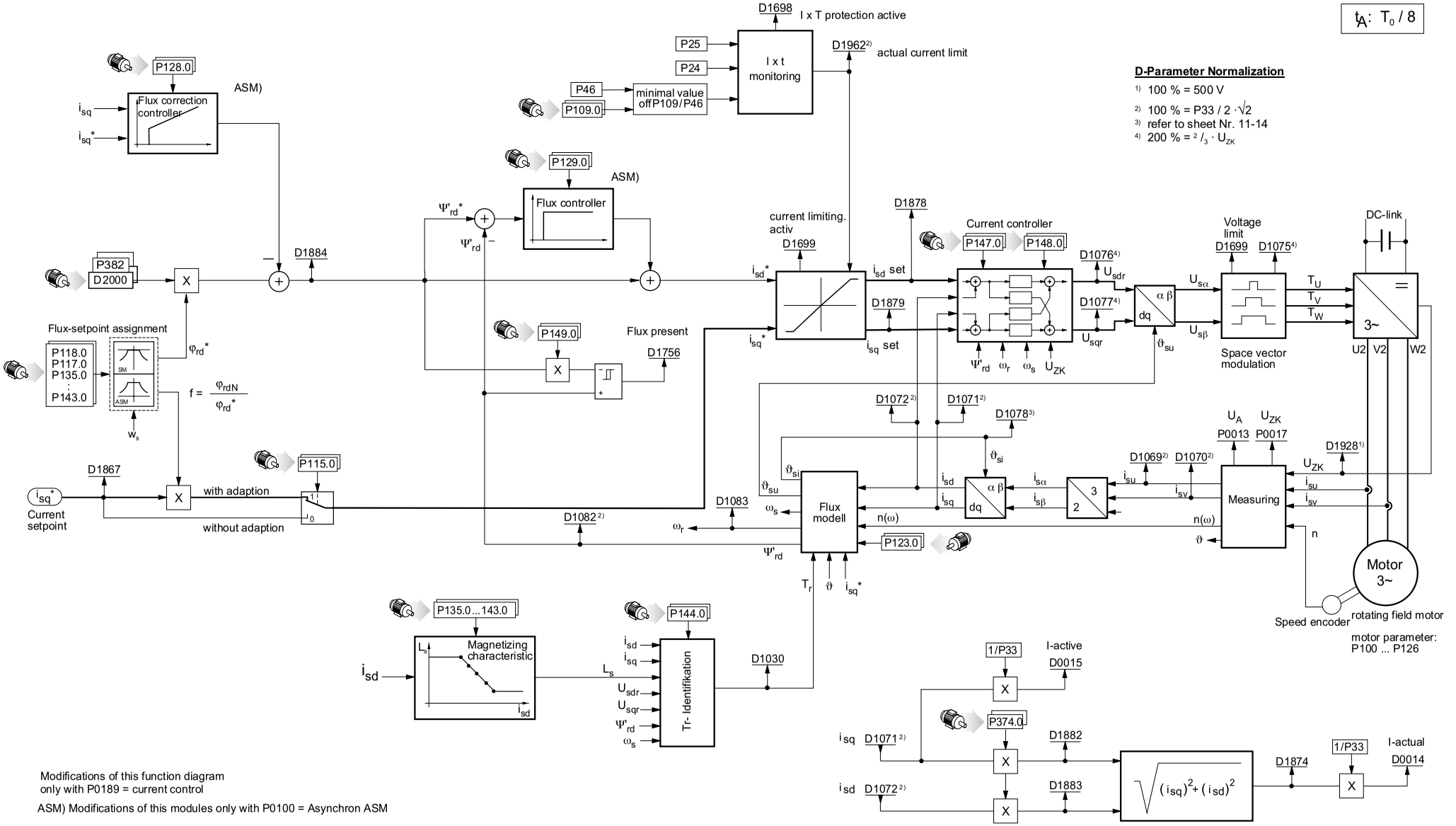
Closed-loop current controlled operation: Standard setting (field-oriented operation)

Motor identification: If this mode is selected, the next time that the inverter is enabled, an automatic motor identification routine is executed. A voltage is output and a test current flows. The motor does not rotate (the shaft might make short notching movements).

Prerequisites for automatic identification:

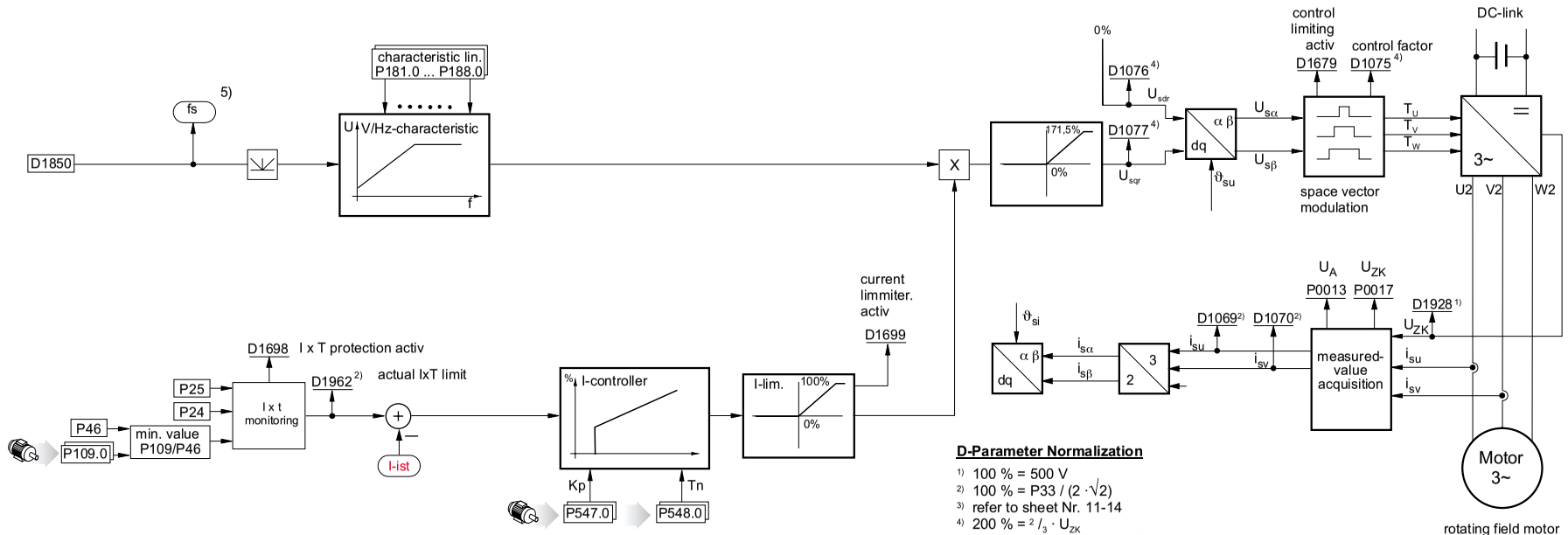
- The motor is connected with the selected encoder (P130)
- Encoder data (P130 onwards) and the motor rating plate data (P1 onwards) have been entered.
- During the identification routine, the yellow LED flashes quickly and ”Motor identification” is indicated in the display. Depending on the particular motor, the identification routine can take several minutes. After the identification routine has been completed, ”Mot ID ready” is displayed and the yellow LED flashes slowly. The drive converter should now be powered-down. After this, the determined data is automatically saved in a non-volatile fashion in the EEPROM (this means that data cannot be lost during power failures).
- When required, a new identification run can be made (if this is done several times, this can result in further improvements).
- If no further identification routine is required, then after power-off, P189 should be set to closed-loop current controlled. The drive converter can now be operated again in the normal mode. The determined values can be viewed in the following parameters (all of the quantities are phase quantities).
- Induction motor
  P117 - magnetizing current
  P120 - stator resistance Rs
  P121 - leakage coefficient σ
  P122 - stator inductance (for $L_s = f(0.4\ I_n)$; this is the reference value for the magnetizing characteristic P135 ... P143
- Synchronous motor
  P110 - stator resistance Rs
  P111 - three-phase inductance L_D

Normally, the motor can be operated with values estimated from the rating plate data. However, better results can be achieved using the motor identification routine.



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Closed-loop motor control	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **25**



D-Parameter Normalization

1) 100 % = 500 V
2) 100 % = P33 / (2 · √2)
3) refer to sheet Nr. 11-14
4) 200 % = $^2/_3 \cdot U_{ZK}$
5) fs (Hz) = $\frac{P114 * P390}{60s} * \frac{D1850}{100\%}$

P114 = pole pair number

Modifications of this modules only with P0189 = voltage-controlled

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** V/Hz characteristic (special operation)	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **26**

Resolution of the position information

The resolution is not rigidly linked with the encoder pulse number. As part of the required positioning accuracy, it can be selected to be lower. This is interesting, especially for high-resolution encoders, e.g. ERN1387, as the maximum distance depends on the position actual value resolution and the memory depth of the counter.

P780 Resolution in increments per motor shaft resolution. When entered via the operator panel, values to the power of two (1024, 2048 etc.) can be selected from a list. When entering via the interface, the assignment should be taken from the parameter list.

Which setting should be selected? Required positioning accuracy x 4, however not higher than the encoder accuracy (for pulse encoders P130 x 4, for resolvers 4096...8192, for ERN 1387, approx. 2^{17}).

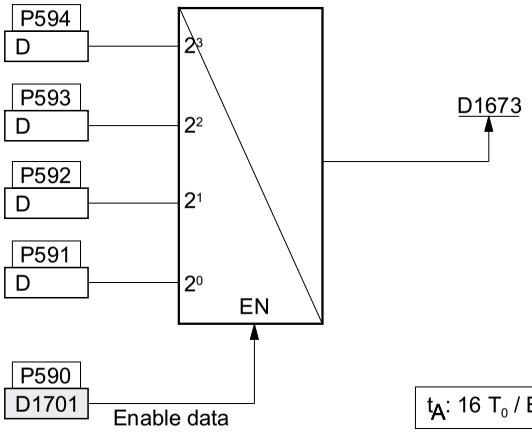
Normalization of the position values

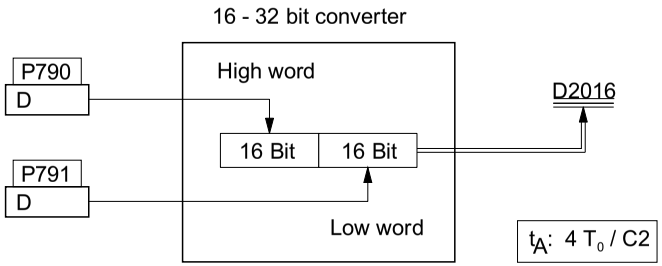
P781..P783 Using these parameters, an adaptation is made to the position unit at the machine (e.g. mm) for the motor rotary motion. Enter the circumference or diameter (depending what is specified) of the drive pulley into P781, whereby P783 must be appropriately selected as to whether the data in P781 refers to the diameter or circumference. Enter the gearbox factor into P782, which is located between the drive pulley and motor shaft.

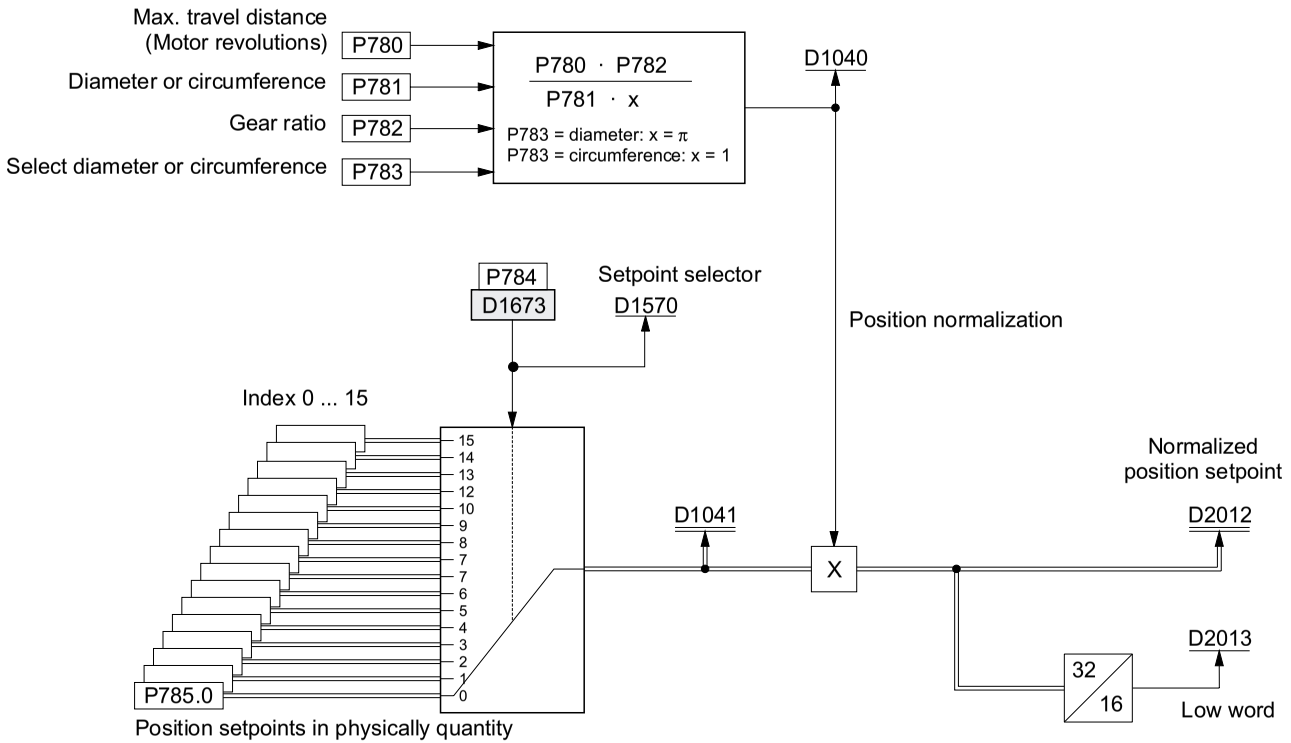
P785 Position reference value memory: The value is entered in the selected lengths units, refer to the normalization, P781...P783. One of the 16 position reference values is selected via the D parameters entered in P784.

Connecting 32/16 bit D parameters to variable parameter sources

All of the signal paths, which are designated by a double line, are processed with 32-bit word format which means that there are both 32 bit D parameters (e.g. D2012, D2014...) as well as also 32 bit parameter sources (P647...P649). This also means that there is a 32-bit connection when connecting these parameters. When connecting a 16 bit D parameter to a 32 bit source or a 32 bit D parameter to a 16 bit source, only 16 bits of information is transferred, whereby the high word (bits 16...31) of the 32 bit value is always used.
If a16 bit value is to be connected to the low word of a 32-bit source, or a 32-bit value is to be generated from 16 bit components (e.g. when transferring PZD from interfaces), the 16-32 bit converter can be used.







1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52**
Position reference value memory

Rexroth Indramat

Date: 2001-01-15

Firmware: FWC-SR1700-200-04VRS-MS

Sheet No. **27**

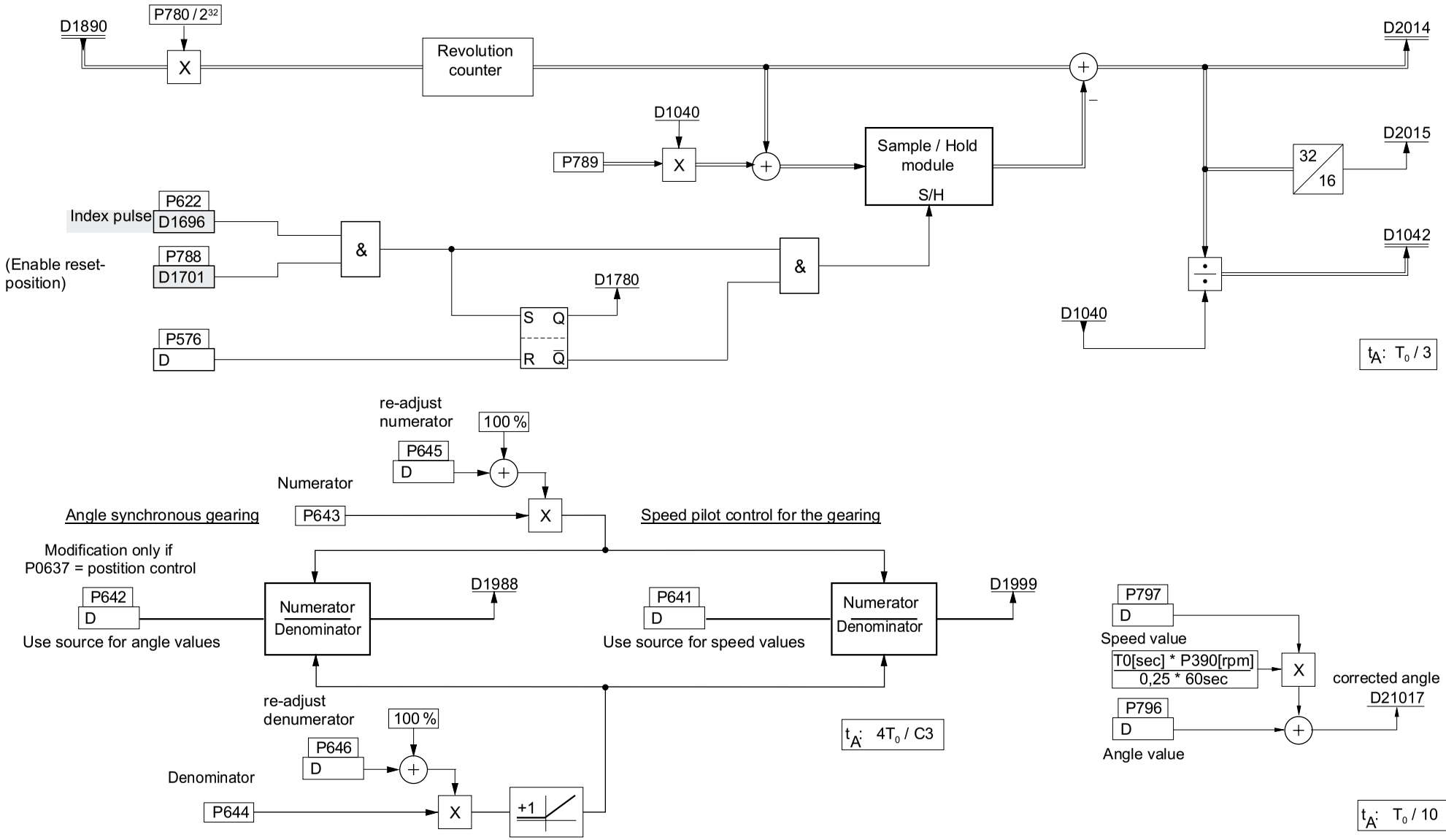
Position actual value referencing

The position actual value must be set once each time that the unit is initialized (power supply On). This is generally realized using a reference contact, which marks a pre-adjusted point along the distance to be moved along (zero range). This contact should be connected to P788 via a digital input. For encoders with zero pulse, an adjustment which is still precise enough, can be achieved (P622 = D 1696).

P789 The difference between the required position zero and the reference mark, is entered in the same lengths units as for the setpoint memory P785.

Angular correction module for the electronic shaft

If an electronic shaft is established between several inverters using a SynchroLink connection, the incoming angular setpoint from SynchroLink must be corrected. The output of the angular correction module (D1207) can be entered into the position controller as setpoint (reference value).



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Position actual values, angular synchronous gearbox	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **28**

Closed-loop position controller with root characteristic

General information: For travel to a target with constant deceleration (braking torque), the velocity (speed) behaves like a root characteristic over distance. This is taken into a consideration by the characteristic in the setpoint [reference value] / actual value difference of the position controller. However, the stability criteria of the complete position control loop (linear section) determines the gradient at the zero setpoint.

Procedure when commissioning:
The position controller can be set after the current and speed controller have been optimized.

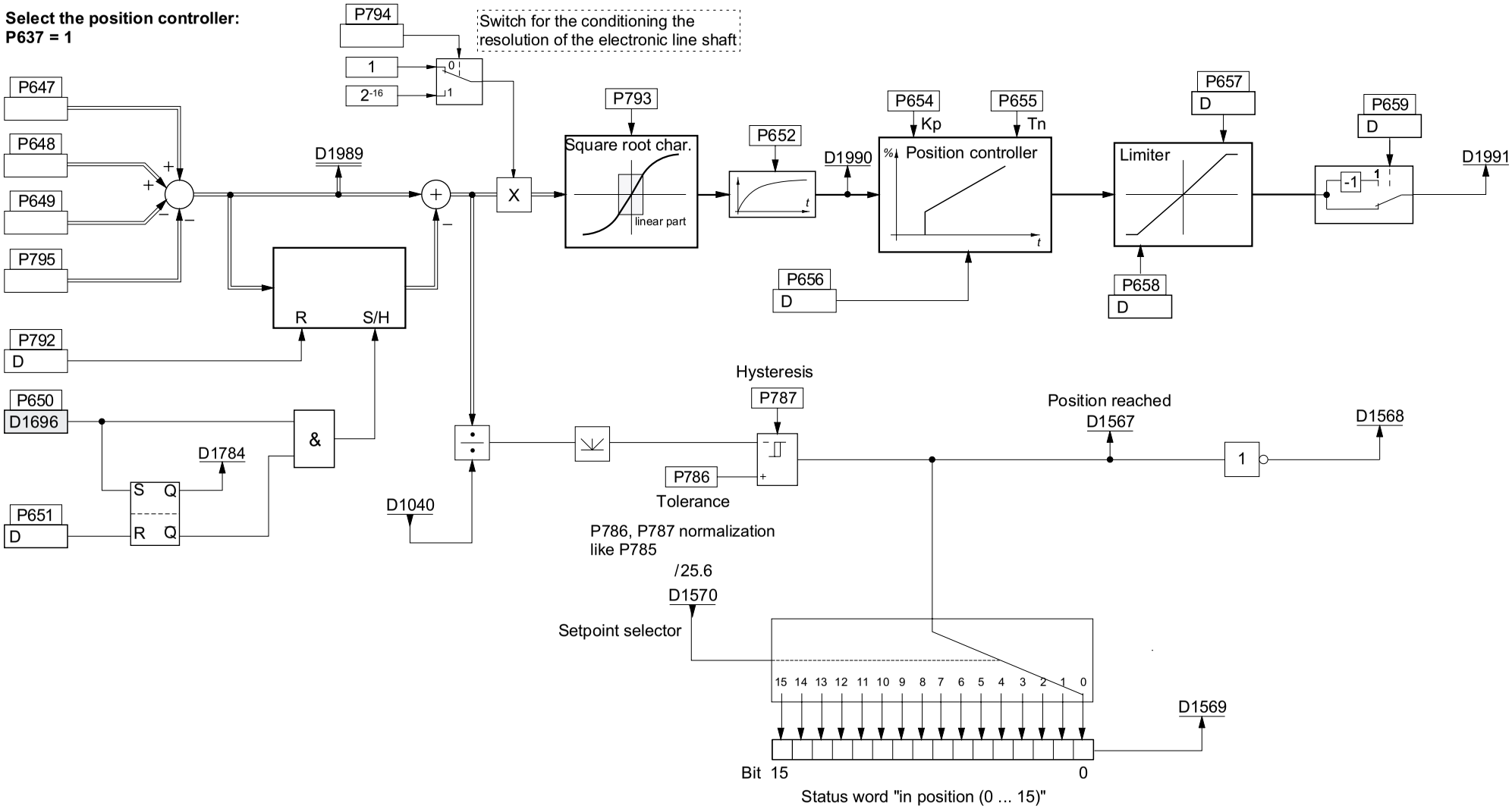
- Set the linear section to an average value with P793 - approx. 10 %
- Set the controller gain P654 to 0.5
- Set the integral action time P655 to 0 ms (disabled)

Bring the position deviation to zero and enable the position controller. Enter a low setpoint step and monitor the step response using the REFUwin oscilloscope. The setpoint step amplitude should be set small enough (just a few increments) so that the speed controller does not go to its limit. The low signal behavior can be optimized using the controller gain P654. Typical values lie between 1 and 5. Set P793 so that for large signal changes of the position reference value, the maximum deceleration torque is reached; the speed controller must remain in the active range (increasing P793 increases the torque).

Position controller expansions

1. The angular addition location of the position controller has an additional inverted input with P795. This means, that especially when using an electronic shaft, an additional angular offset can be entered.

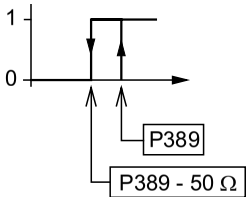
2. For the electronic shaft application, if angle D1890 is used as reference value / or actual value for position controller, which precisely emulates one motor shaft revolution, then the loop normalization with parameters P780..P784 is not required. Angle D1890 is a 32 bit quantity, however its resolution is far too high (2^{32} increments/360 degrees), which means that the angular difference can be reduced by a factor of 2^{16} using P794 (switch).



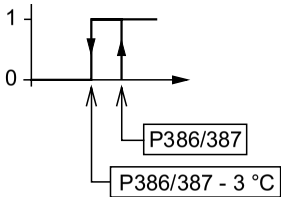
1	2	3	4	5	6	7	8

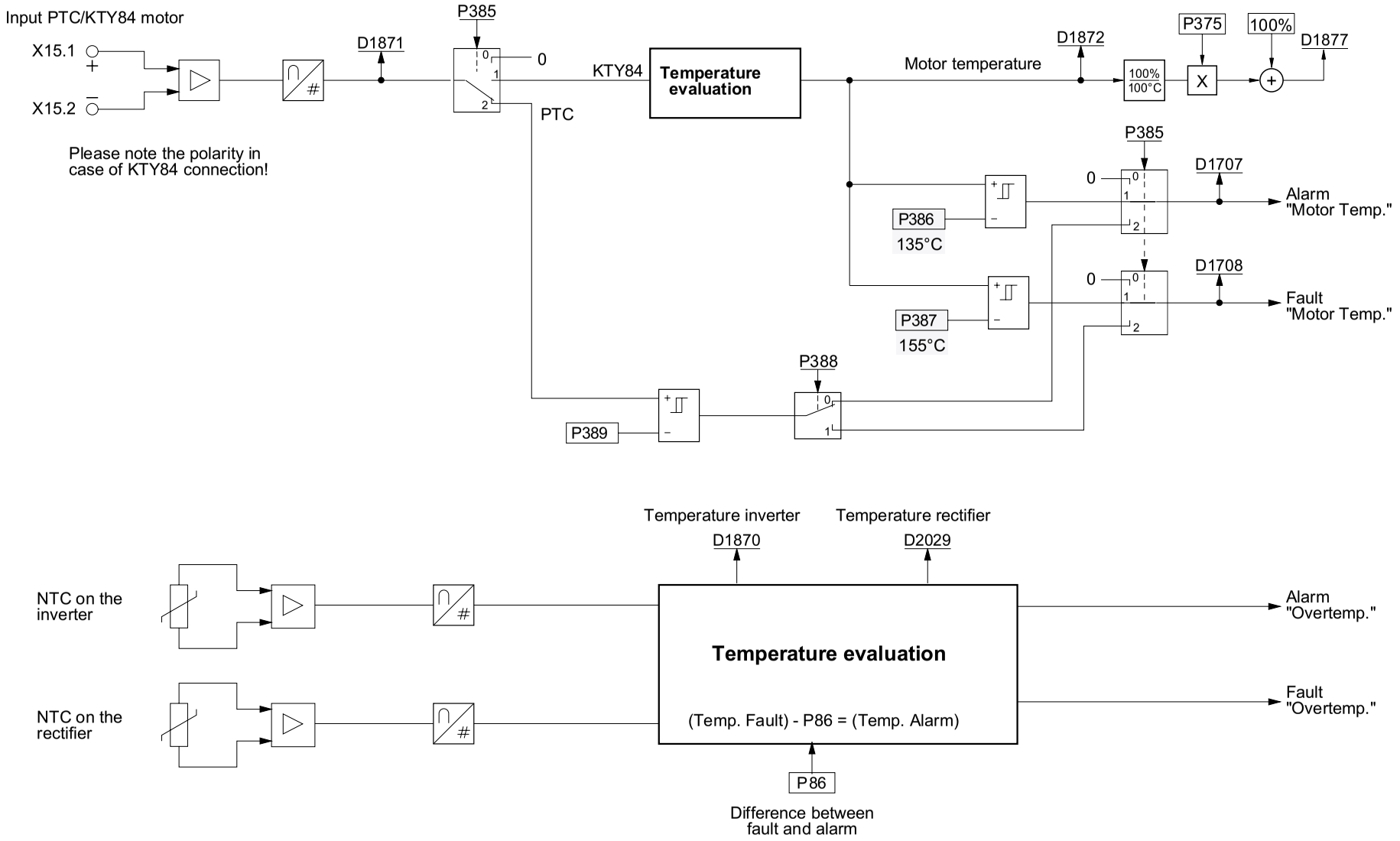
Function diagram **REFUdrive 500 - RD52** Position controller	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **29**

Switching diagram of the comparator PTC



Switching diagrams of the comparators KTY





1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Temperature evaluation	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **30**

Plotting the friction characteristic

The friction characteristic automatic plot can be called-up via a digital input or via the serial interface (connect the appropriate control bit in P359). The unit power-up, operating enable and / or speed controller enable are parameterized so that they correspond to the other drive requirements.

Example:

- Assign digital input 3 to the “Plot friction characteristic” control signal; to realize this, set P465 to “Input” and connect D1716 to P359.
- Enter the speed setpoints for the friction characteristic in P345.0 to P345.9 in an increasing sequence. This means that the density of the points along the characteristic are adapted to the friction characteristics.
- Enter the ramp-up time in parameter P458. This value is also automatically used for the ramp-down time. The rounding-off is 10 %.

Automatic sequence

The “Plot friction characteristic” control signal of the selected digital input must be set to high before the “Enable operation” control signal!

After operation has been enabled, the drive accelerates to the first speed (P345.0) with the ramp set in P458. After a delay time of t_W = 200 ms + 100*T_n, the speed encoder output value is averaged over 10*T_n and transferred in parameter 346.0. Tn is the integral action time of the active parameter set associated with the speed controller (P336 or P338).

The next speed values are then approached. After the last value, the drive goes down to zero speed along the ramp and sets parameter D1759 to 1 (= “Friction characteristic plot completed”). This parameter can be output via a digital output or via the interface for an external control. This means that the external control recognizes the end of the friction plot and removes the operation enable and the ”Plot friction characteristic” control signal. This means that D1759 is again set to zero and the friction values are saved in the EEPROM so that they cannot be lost when the power fails (this means that they are saved in a non-volatile fashion).

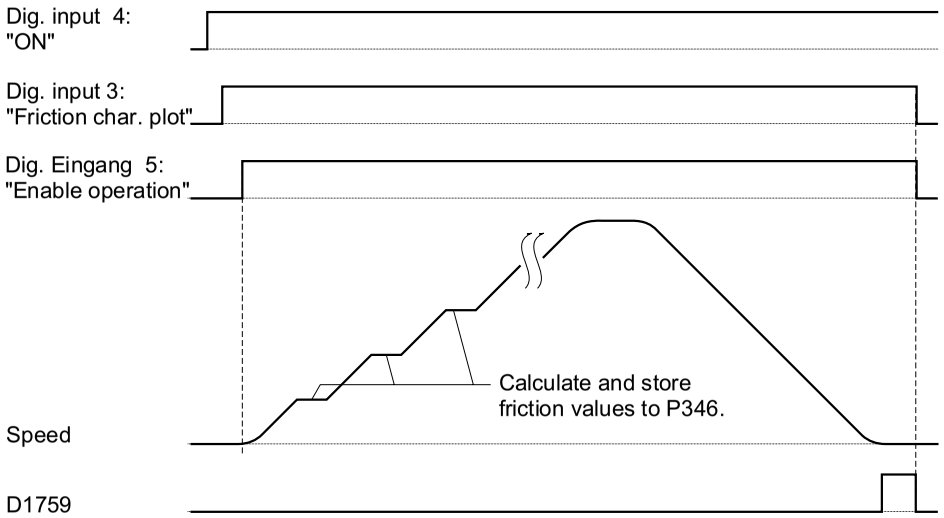
Interruption

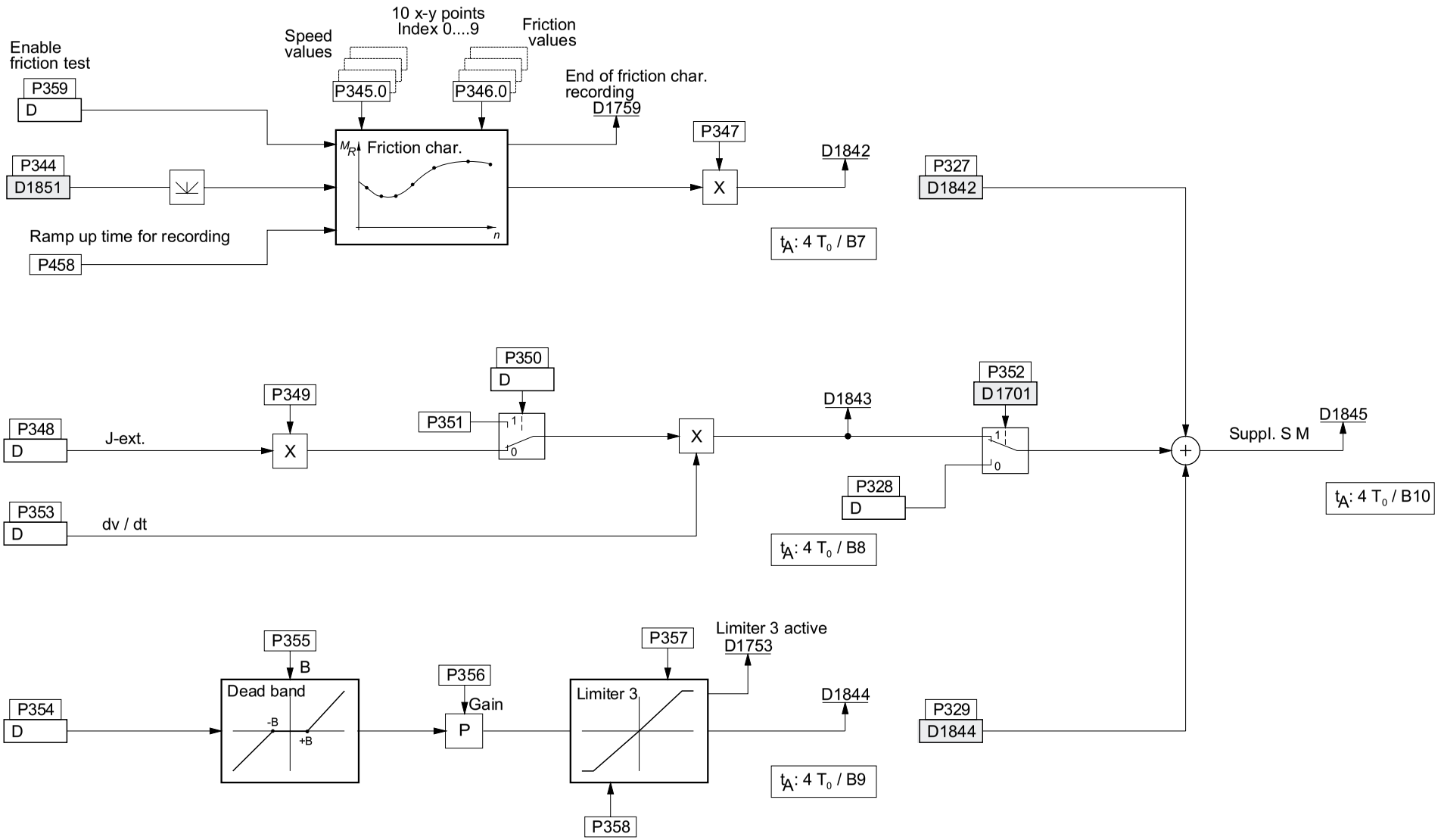
The friction plot can be interrupted by withdrawing the operating enable. The friction plot is then continued at the previous location after operation has been re-enabled.

Cancellation

To cancel the operation, the “Operating enable” and the ”Plot friction characteristic” control signal must be withdrawn. The newly plotted friction values up to this time, are saved in the operating memory, and remain valid until the power supply voltage is powered-down. The old friction values must be transferred out of the EEPROM when powering-up again.

Plotting the friction value diagram



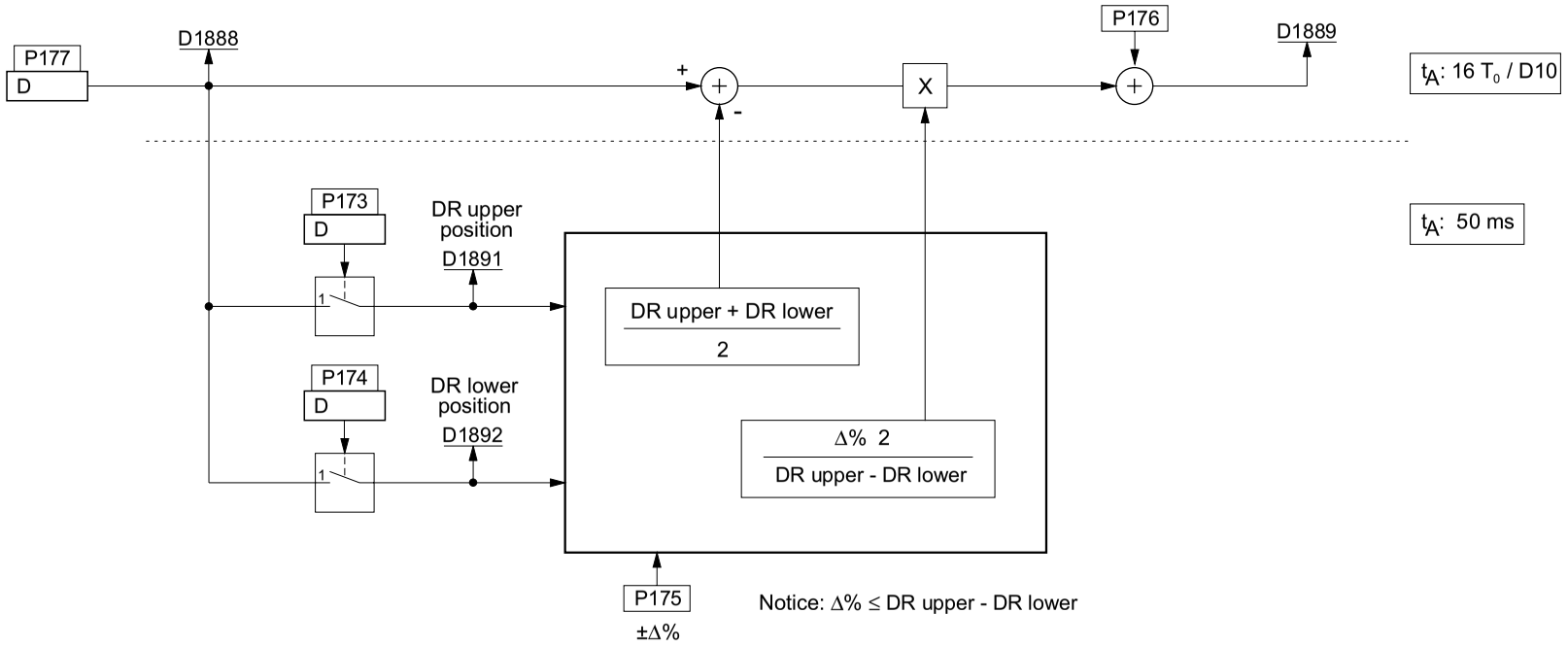


1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Friction characteristic, dv/dt input	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **31**

Dancer rolls “teach-in” function

Commissioning a dancer-roll control system is made significantly easier and speeded-up using the teach-in function. The dancer roll is connected to the drive converter as usual.
A 0 ... +10V reference voltage is available for the potentiometer feedback, if the analog output is not required. The dancer roll output can be connected at any drive converter analog input. The appropriate D parameter of the analog input must be connected in P177.
When executing the dancer roll ”teach-in” function the normalization and the offset (dancer roll center) are calculated from the analog values of the upper and lower dancer roll end positions and the required (parameterizable) dancer roll intervention. This offset can be additionally adjusted using a parameter.
The dancer roll correction signal is available at parameter D1889. The calculation is initiated by activating a digital input. The assignment is realized separately for dancer roll top and dancer roll bottom, so that two digital inputs must be parameterized. In order that the values are saved in the EEPROM in a non-volatile fashion, the digital input must be activated for at least 2 sec during the teach-in operation.
After the ”teach-in” function has been completed, these digital inputs are no longer required, and can be used for other functions by re-parameterizing them.



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Dancer roll „Teach-in“ function	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **32**

Controlling a mechanical braking device

P89 [1701] Freely-available control input of the AND logic operation (output D1668)
Using this parameter, an external or internal condition can be specified for the brake control, e.g. Emergency Off.

P90 Control input of the OR logic operation (output D1669)

P90 = D1700 Function, operating brake
The brake is immediately closed after the “OFF1” or “Inhibit operation” command, and brakes the motor.

P90 = D1746 Function, holding brake
The brake only closes for $n<n_{min}$ whereby the switching threshold n_{min} is specified with P392.

P92 [0 sec] Switch-out delay after the “OFF1” or “Inhibit operation” command
The mechanical brake delay time when closing can be compensated using this parameter. After the Off command, the inverter remains operational until the brake is completely closed. This prevents a no torque condition during the brake delay time.

For a command “OFF 2” (power-down), “OFF 3” (fast stop), function no-load coast down or fault, the brake close signal is immediately output without delaying the inverter inhibit.

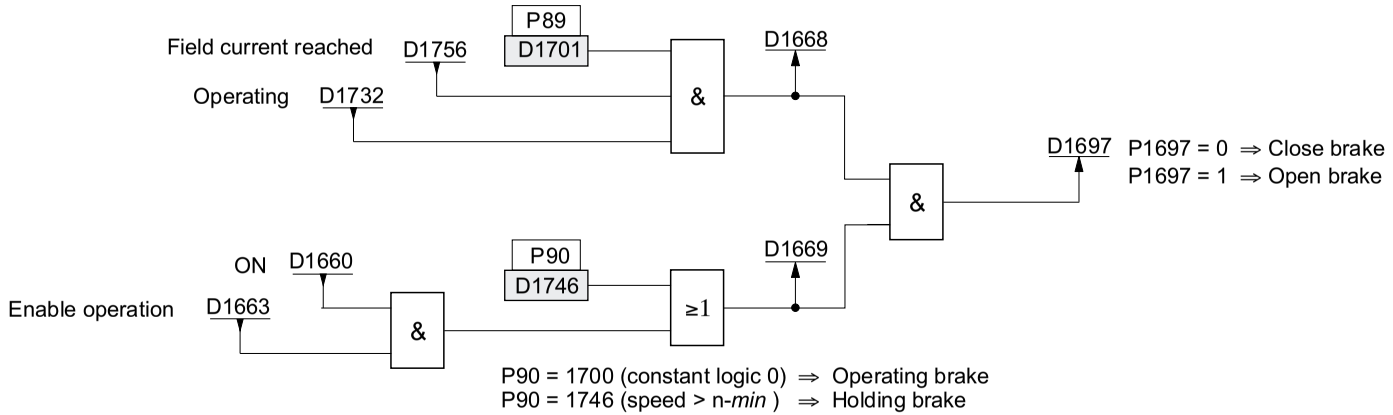
Function description

Switch-on command for holding or operating brakes:
Parameter D1697 is available as control command for a mechanical brake.
As for all display parameters, it can be freely logically combined, e.g. at a digital output or to control word 2

Status 0 “Close brake” command
Status 1 “Open brake” command

The control logic ensures that the brake can only be opened when the field current has been established (isd), and in the status “Operation enabled” (no fault/alarm).
For induction motors, the full motor torque is then available.
For permanent-magnet synchronous motors, bit D1756 is permanently set to 1 in operation.

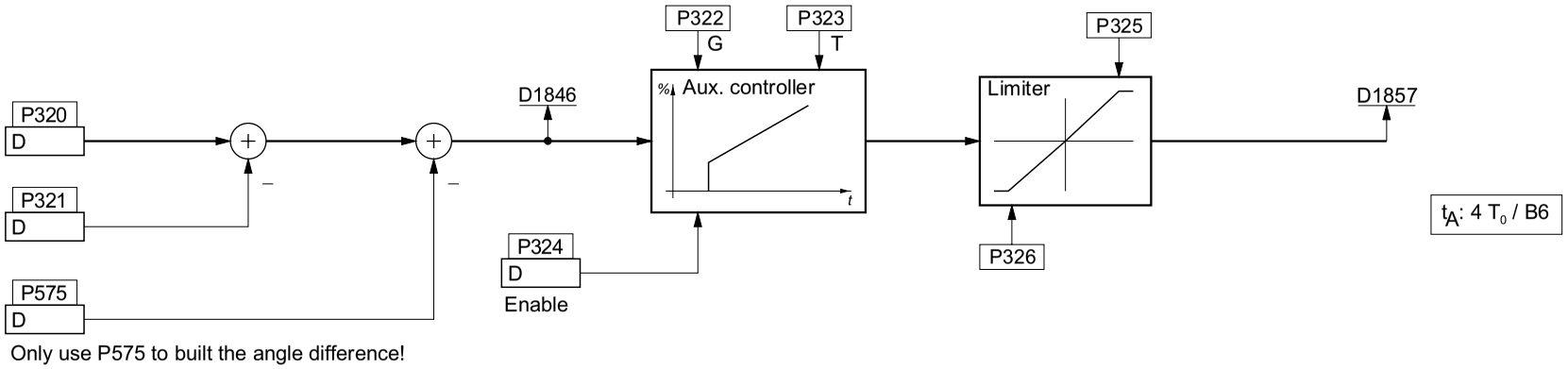
At power-up, the setpoint should be enabled (e.g. ramp-function generator RFG) delayed by the brake opening time, in order to prevent the motor starting with the brake still closed. However, depending on the particular brake type, this can be neglected.



t_A: 10 ms

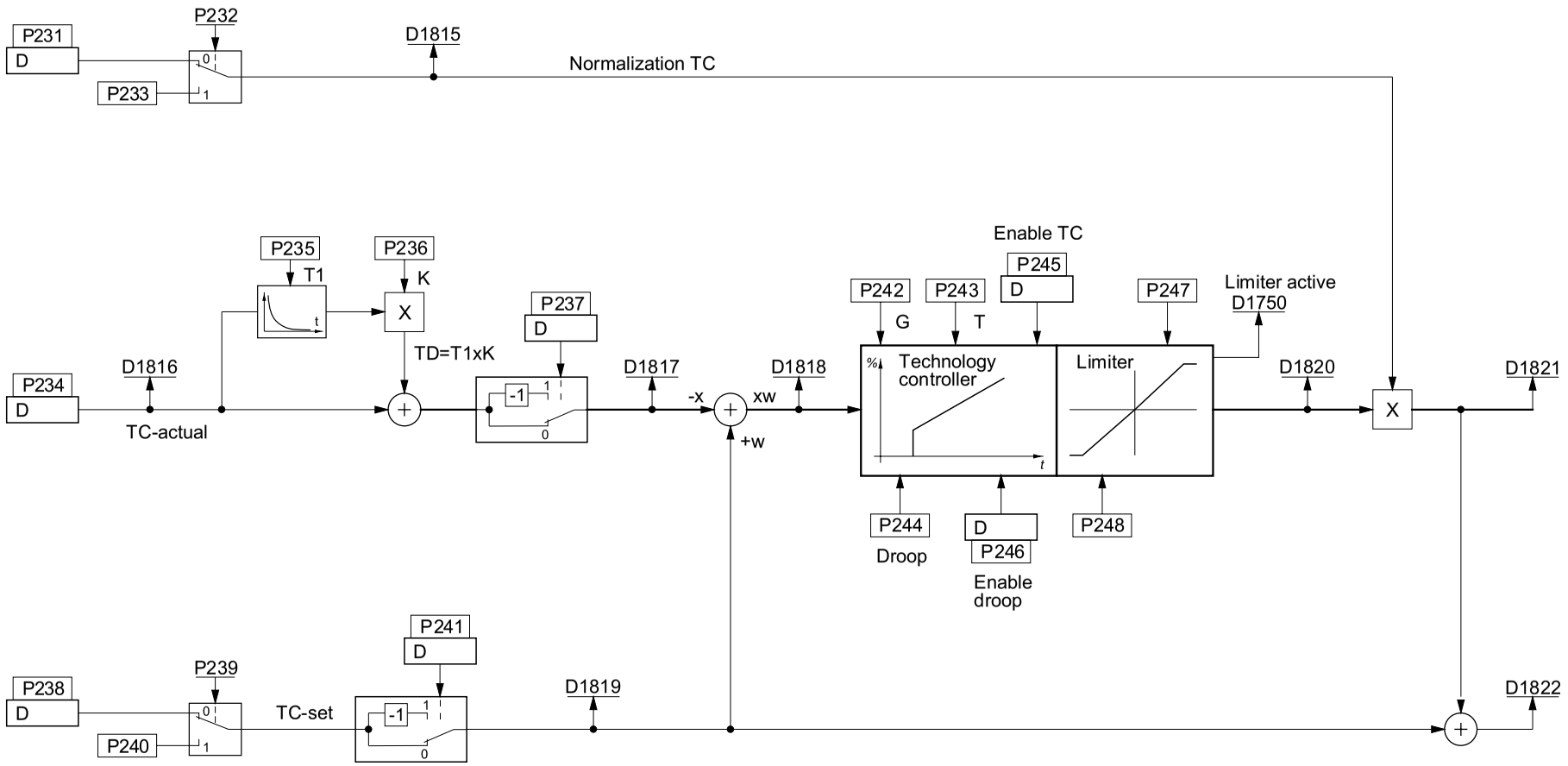
1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Controlling a mechanical brake	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **33**



1	2	3	4	5	6	7	8

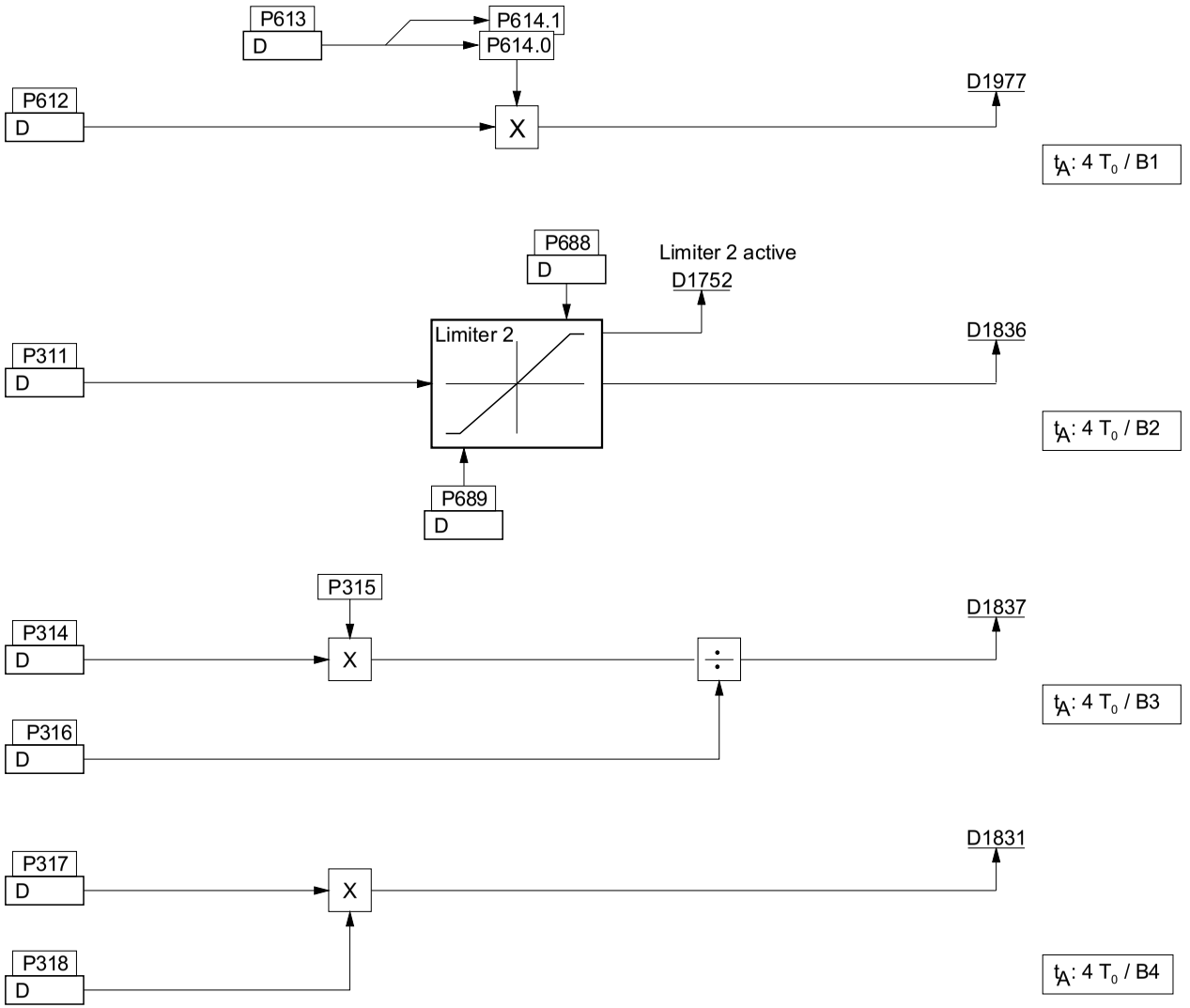
Function diagram **REFUdrive 500 - RD52** Supplementary controller	Rexroth Indramat	Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **34**



1	2	3	4	5	6	7	8

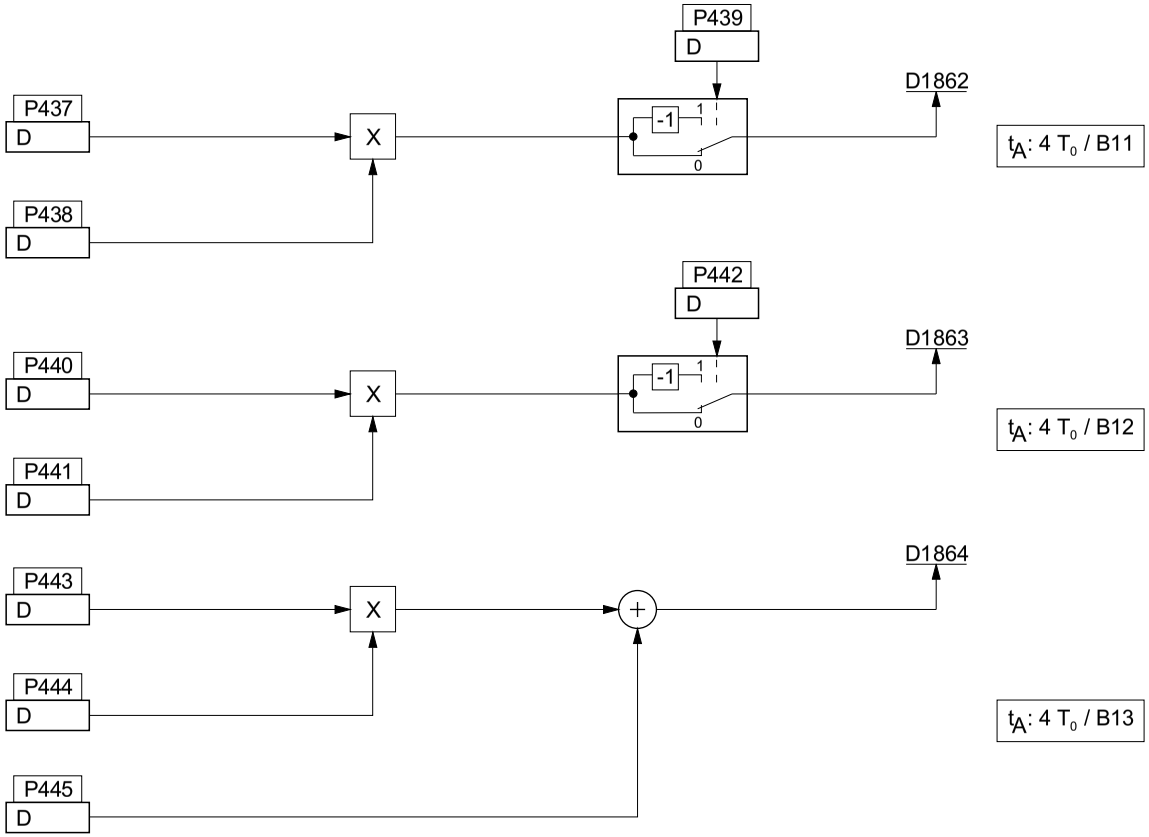
Function diagram **REFUdrive 500 - RD52** Technology controller	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **35**

Rexroth Indramat



1	2	3	4	5	6	7	8

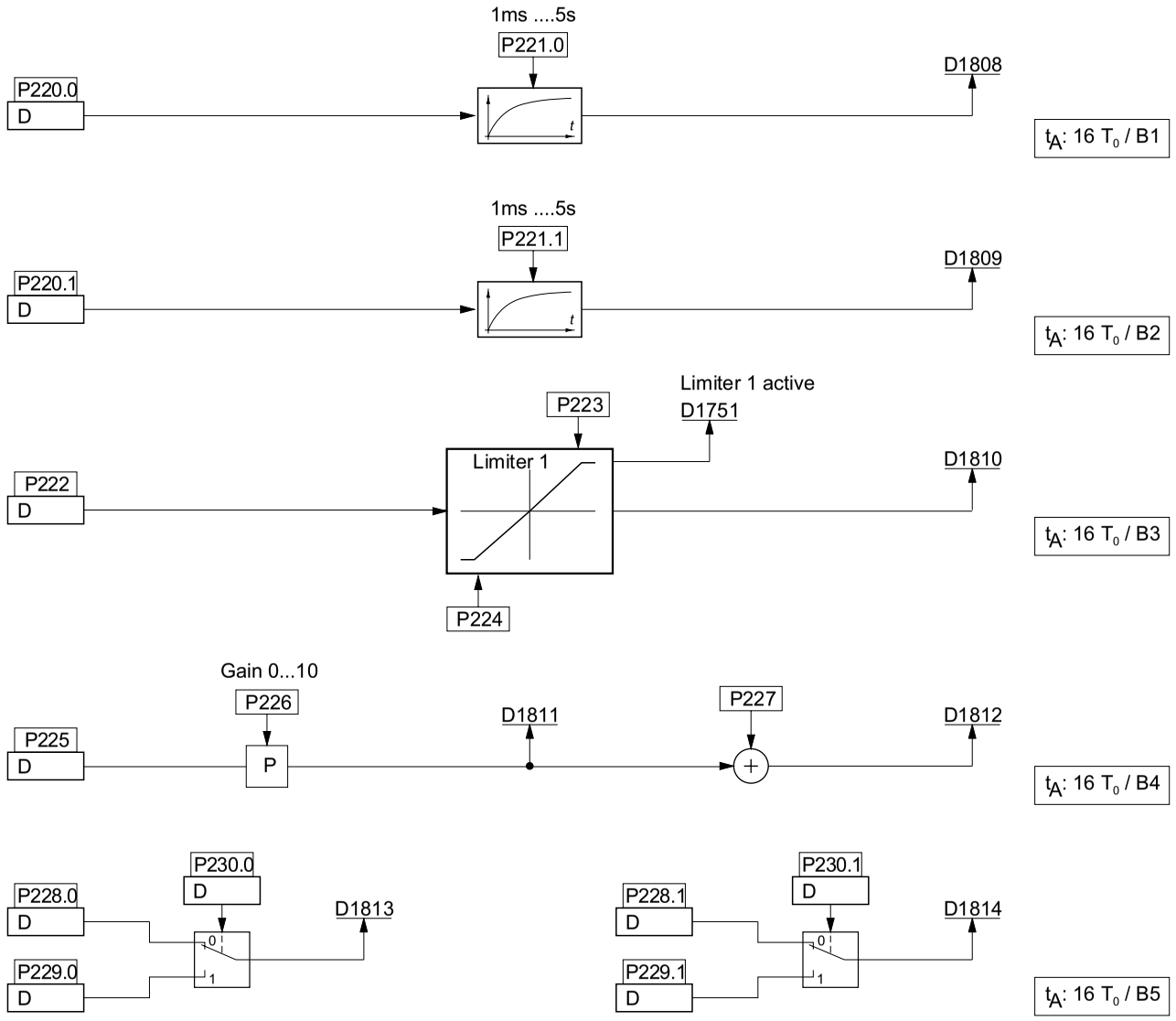
Function diagram **REFUdrive 500 - RD52** Function modules, group 1	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **36**



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Function modules, group 2	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **37**

Rexroth Indramat



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Function modules, group 3	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **38**

The multi-function blocks (MFB) execute arithmetic operations (function) of two or three input values. The function is selected using parameter P158.x.

Explanation of the functions:

1. P158.x = 0 (adder)
   $Y = E_1 + E_2$ (E_0 not used)

2. P158.x = 1 (subtractor)
   $Y = E_1 - E_2$ (E_0 not used)

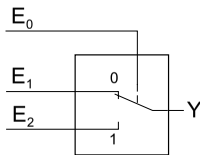
3. P158.x = 2 (multiplier)
   $Y = E_1 * E_2$ (E_0 not used)

4. P158.x = 3 (divider)
   $Y = E_1 / E_2$ (E_0 not used)

5. P158.x = 4 (minimum value)
   $Y = \text{minimum } (E_1, E_2)$ (E_0 not used)

6. P158.x = 5 (maximum value)
   $Y = \text{maximum } (E_1, E_2)$ (E_0 not used)

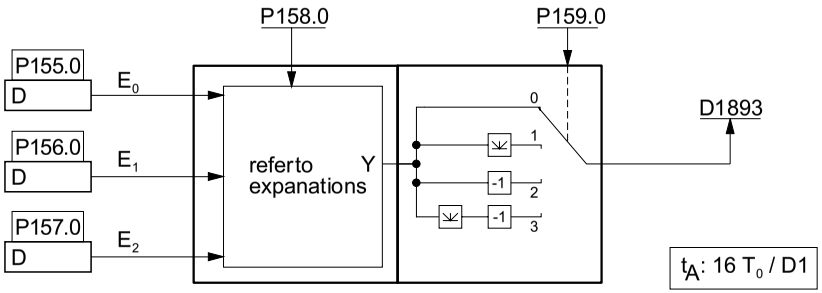
7. P158.x = 6 (process data switch)
   $Y = \text{maximum } (E_1, E_2)$ (E_0 not used)

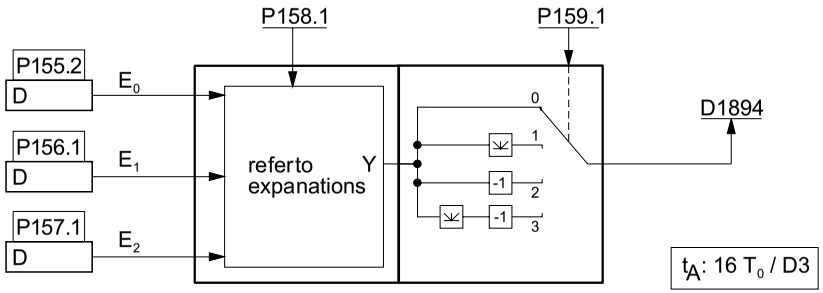


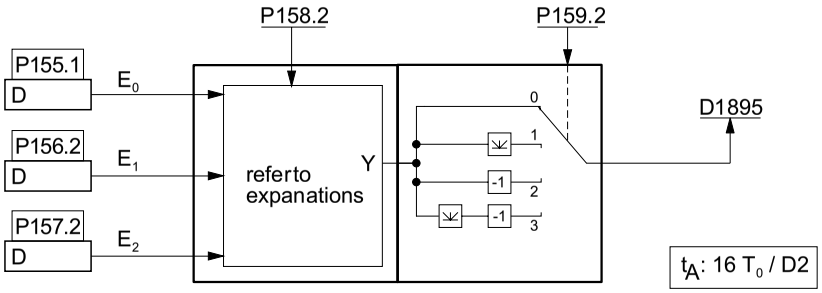
8. P158 = square of the product
   $Y = (E_1 * E_2)^2$

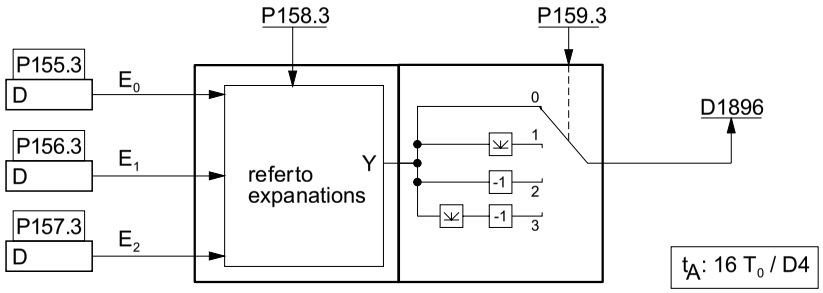
The second stage of the MFB further processes the result Y; the selection is made using P159.x

P159. x	Function
1	Direct
2	Absolute value
3	Inverted
4	Absolute value, inverted







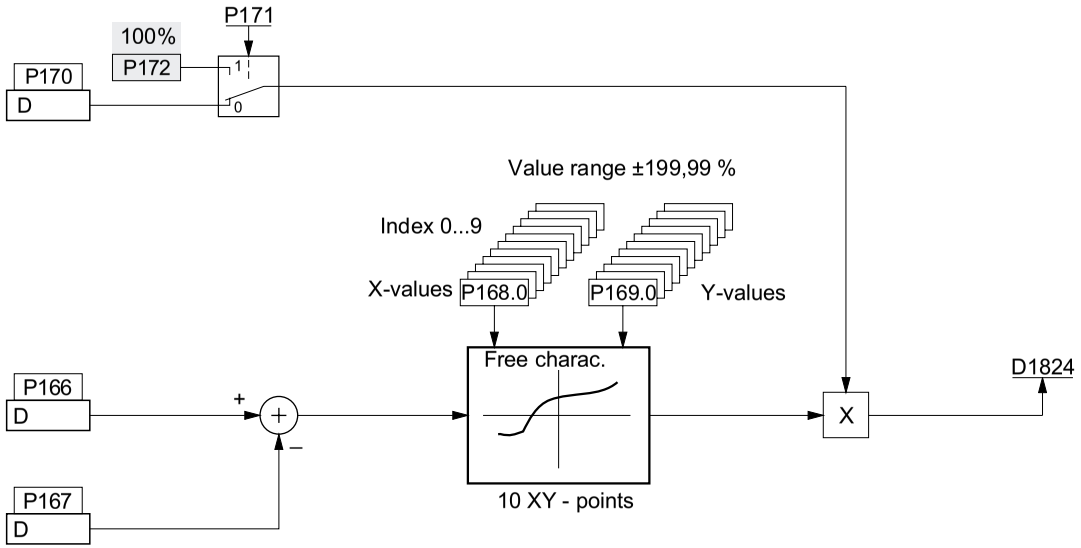


1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Multi-function blocks	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **39**

Free characteristic

The free characteristic has 10 x-y value pairs. In order to increase the flexibility, a differential stage is located in front of the characteristic input, and the output is fed through a normalization function.



t_A: 16 T_0 / D5

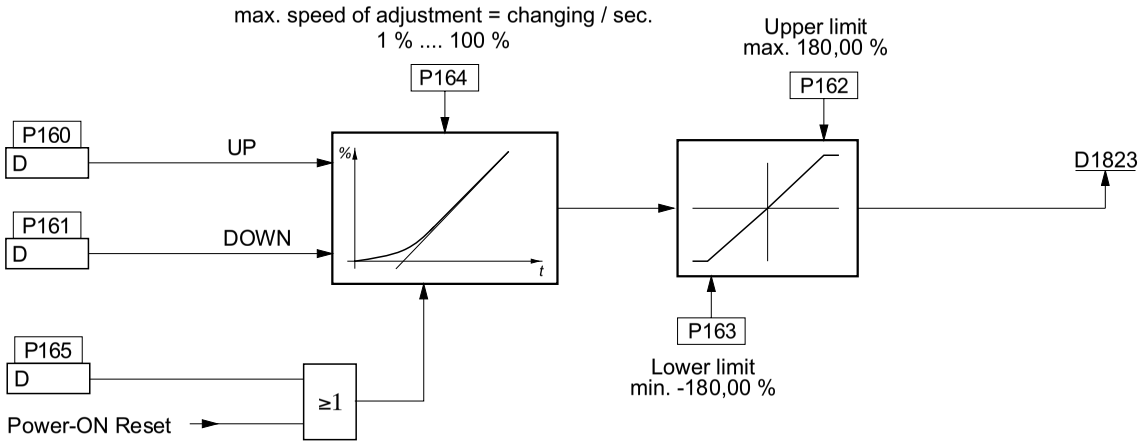
1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Freely-programmable characteristic	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **40**

Rexroth Indramat

Setpoint integral memory

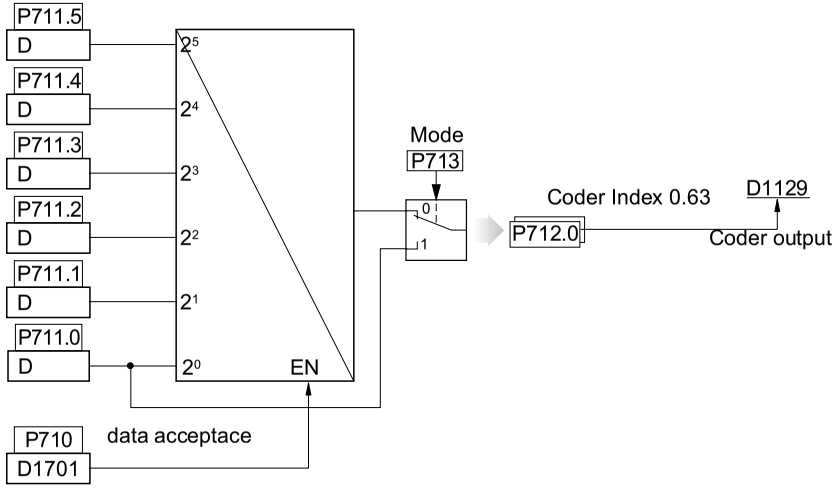
The setpoint integral memory offers a minimum motorized potentiometer function. The setpoint - UP/DOWN control is realized via two digital inputs. The rate-of-change can be set from 1% ... 100% per sec. The range for the upper and lower limit extends from +190 ... - 190%. This means, for example, that a limit can applied to +10 .. +100%.
When the power supply voltage is connected or via the control source P165, the setpoint memory contents are erased.
The rate-of-change of the setpoint integral memory has initial rounding-off.



t_A: 50 ms

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Setpoint integral memory	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **41**



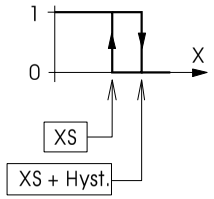
t_A : 10ms /

1	2	3	4	5	6	7	8

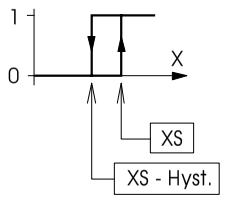
Function diagram **REFUdrive 500 - RD52** Freely-programmable coder	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **42**

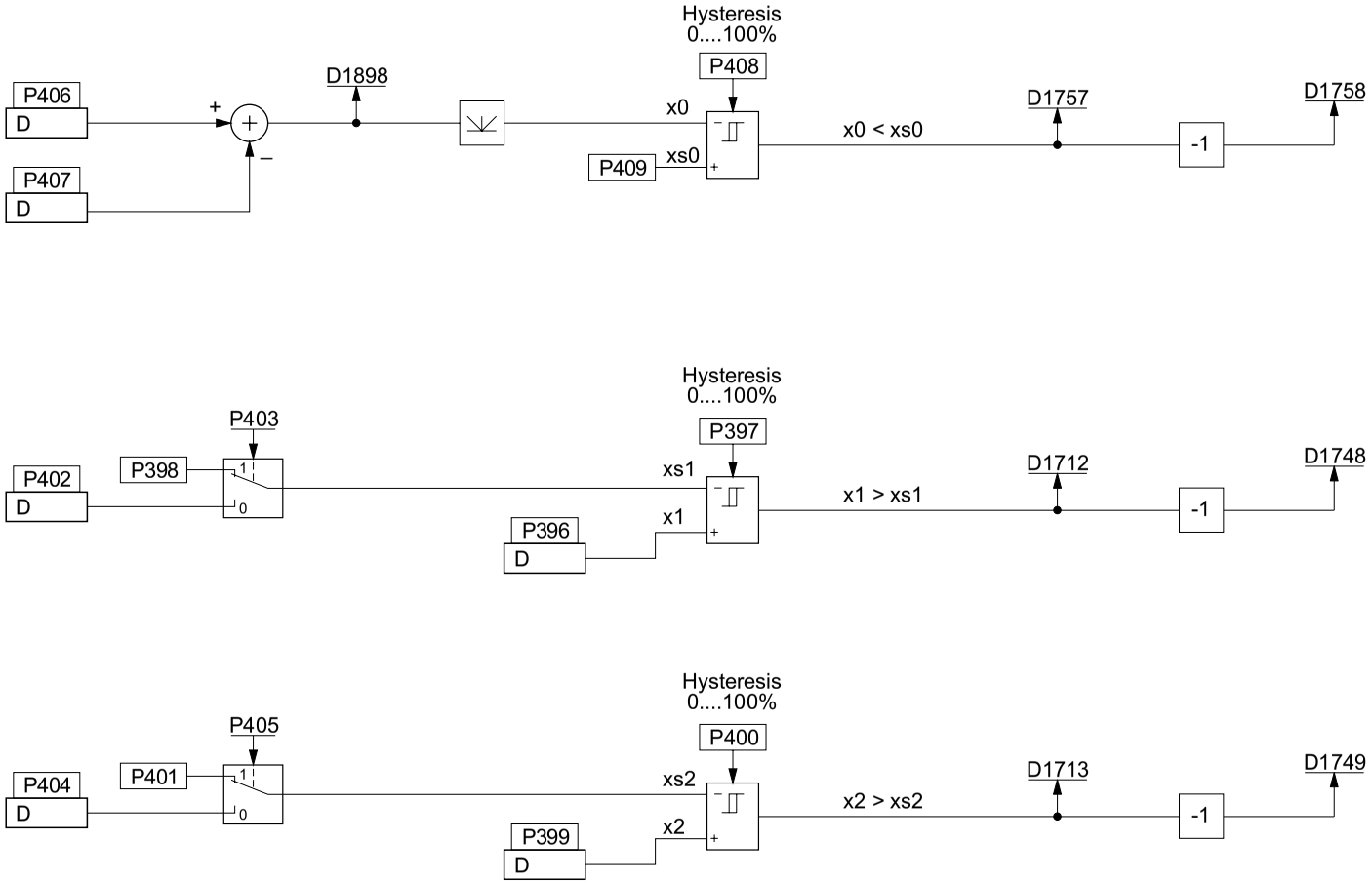
Switching diagrams of the comparators

D1757:



D1712, D1713:





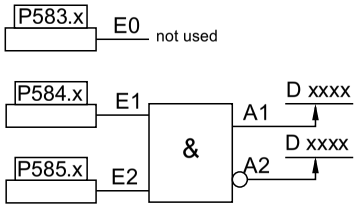
t Ä 4 T0 / B17

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Comparators	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **43**

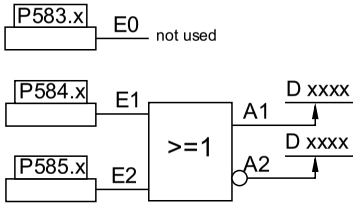
Functionen of logic modules 0...15

Function No. 0: P586.x = AND



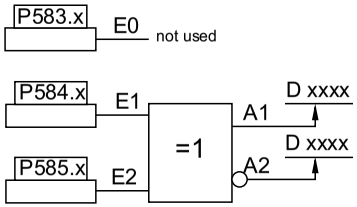
AND			
E1	E2	Q	/Q
0	0	0	1
0	1	0	1
1	0	0	1
1	1	1	0

Function No. 1: P586.x = OR



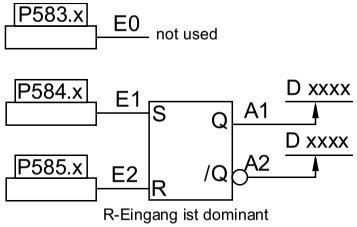
OR			
E1	E2	Q	/Q
0	0	0	1
0	1	1	0
1	0	1	0
1	1	1	0

Function No. 2: P586.x = XOR



XOR			
E1	E2	Q	/Q
0	0	0	1
0	1	1	0
1	0	1	0
1	1	0	1

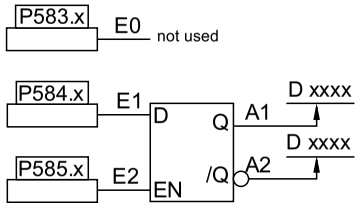
Function No. 3: P586.x = RS-memory



RS-Flipflop			
S	R	Q	/Q
0	0	n	n
0	1	0	1
1	0	1	0
1	1	0	1

n = no change

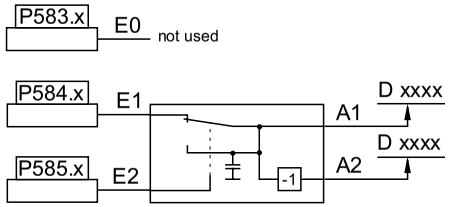
Function No. 4: P586.x = D-latch



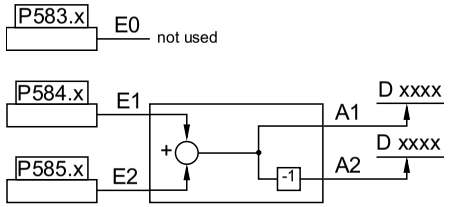
D-Latch			
D	EN	Q	/Q
0	0	n	n
0	1	0	1
1	0	n	n
1	1	1	0

n = no change

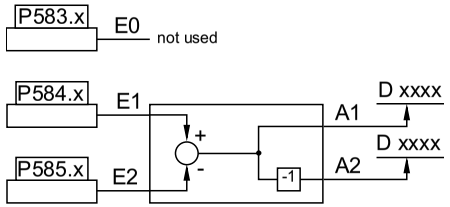
Function No. 5: P586.x = Sampel & Hold



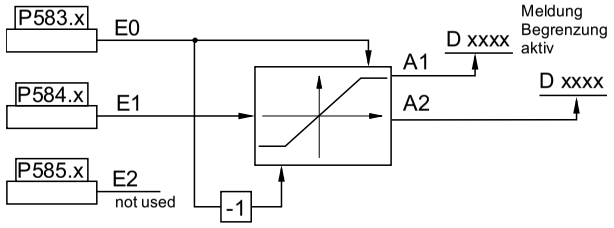
Function No. 6: P586.x = angle add



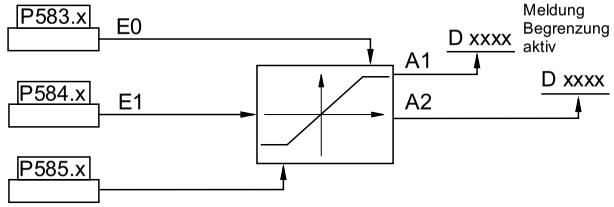
Function No. 4: P586.x = angel subtract



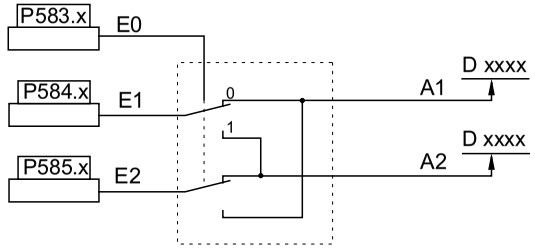
Function No. 8: P586.x = limiter, symmetrical



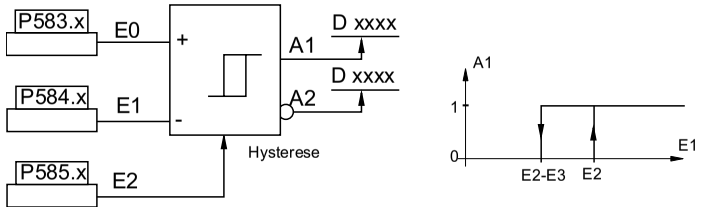
Function No. 9: P586.x = limiter, 3 inputs



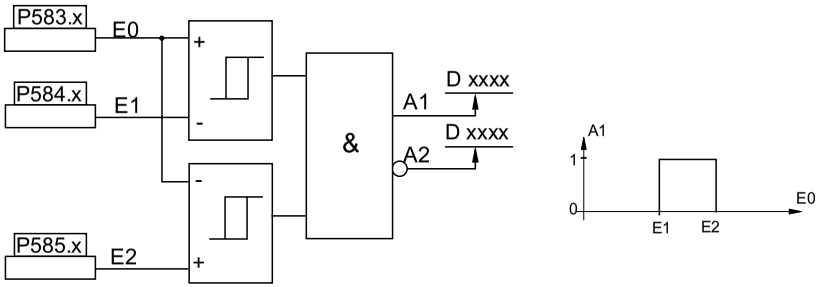
Function No. 10: P586.x = process data switch



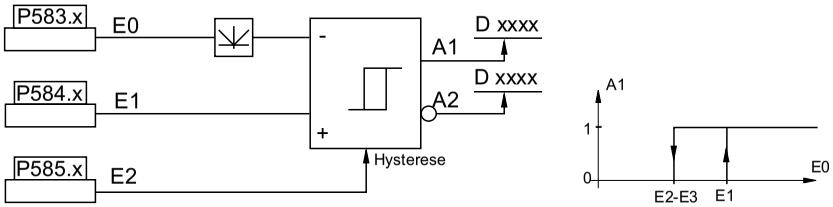
Function No. 11: P586.x = comparator



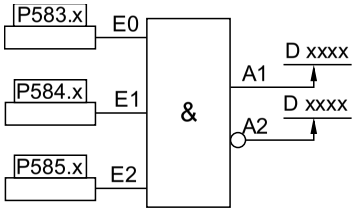
Function No. 12: P586.x = window comparator



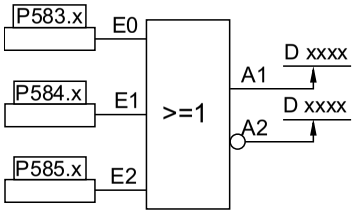
Function No. 13: P586.x = absolute value comparator



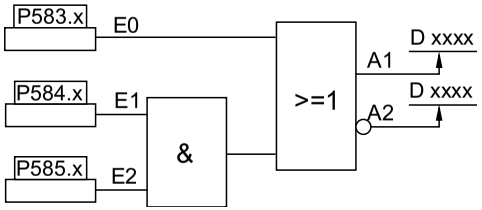
Function No. 14: P586.x = 3x AND



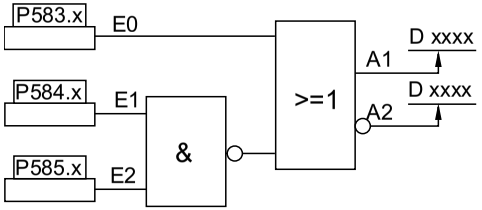
Function No. 15: P586.x = 3x OR



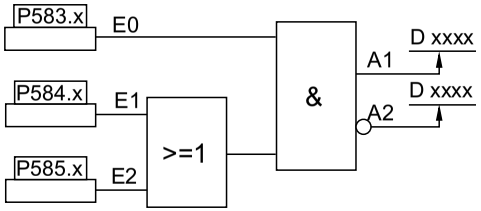
Function No. 16: P586.x = AND - OR



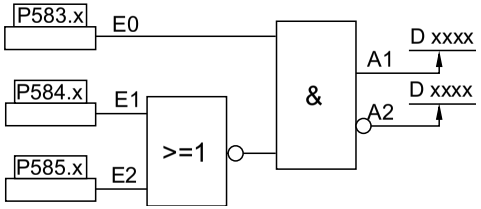
Function No. 17: P586.x = NAND - OR



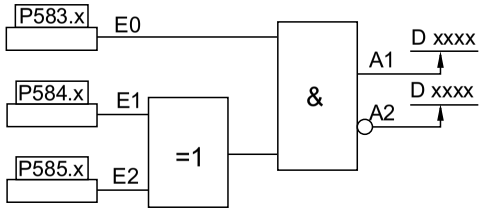
Function No. 18: P586.x = OR - AND



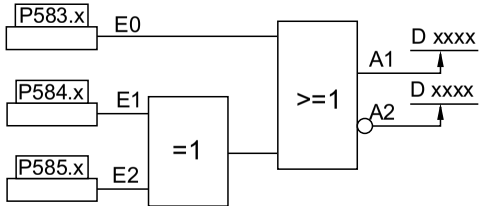
Function No. 19: P586.x = NOR - AND



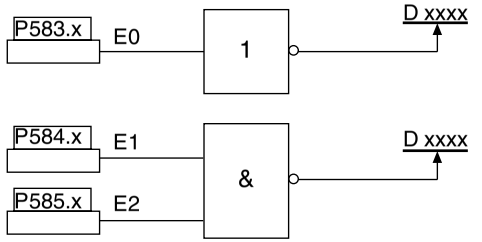
Function No. 20: P586.x = XOR - AND

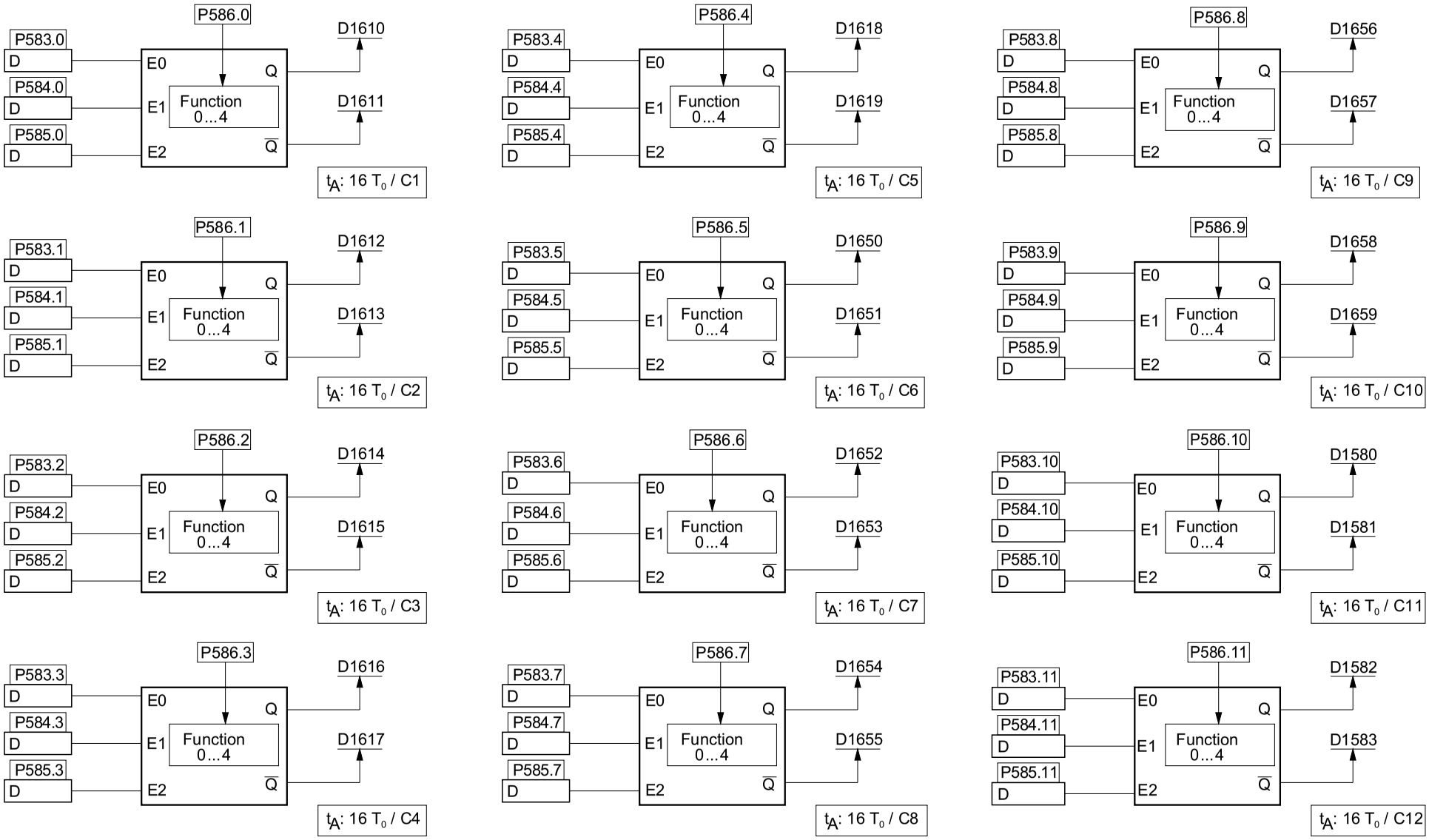


Function No. 21: P586.x = XOR - OR



Function No. 22 : P586.x = Invert / NAND





1	2	3	4	5	6	7	8

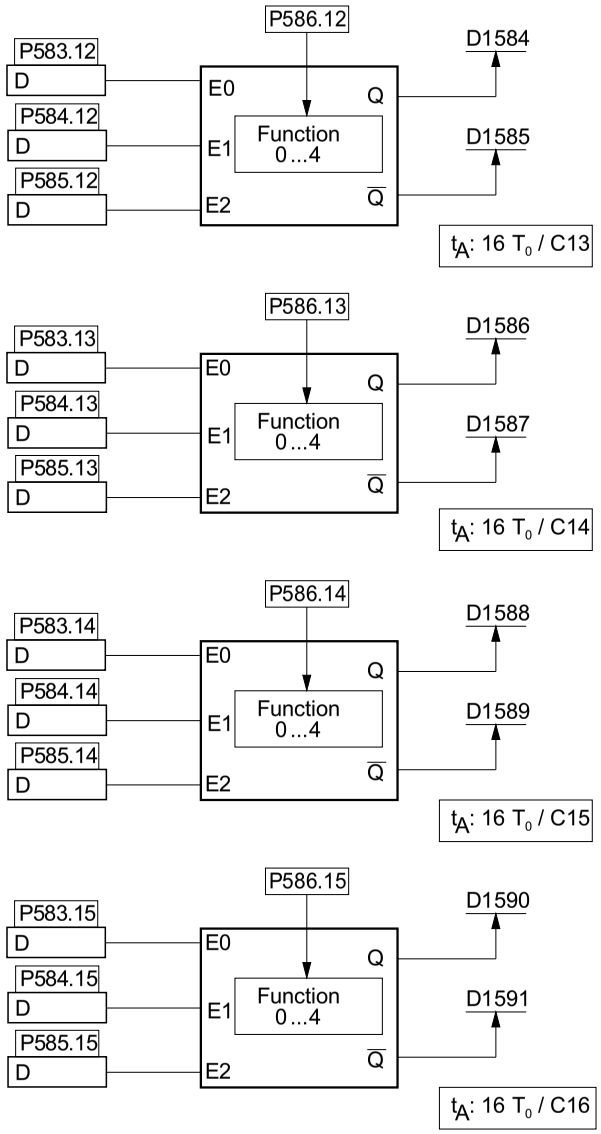
Function diagram **REFUdrive 500 - RD52**
Logic gates

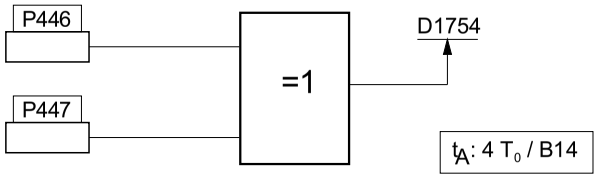
Rexroth Indramat

Date: 2001-01-15

Firmware: FWC-SR1700-200-04VRS-MS

Sheet No. **44**





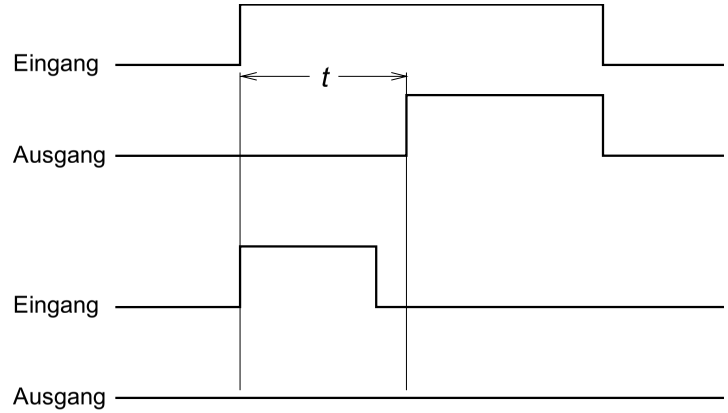
1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Logic gates (continued)	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **45**

Function diagrams of the timer elements:

Function 0 = switch-on delay

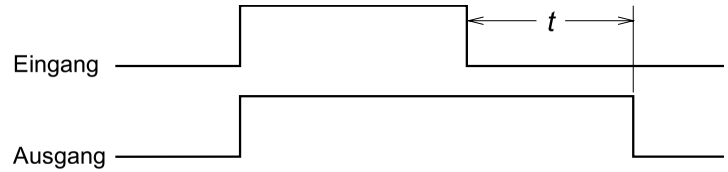
Beispiel 1:



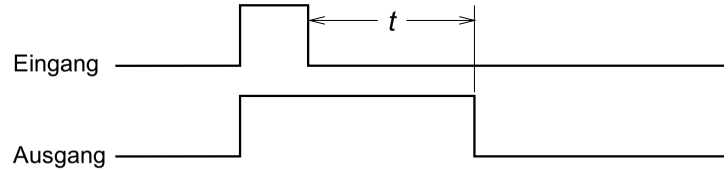
Beispiel 2:

Function 1 = switch-off delay

Beispiel 1:

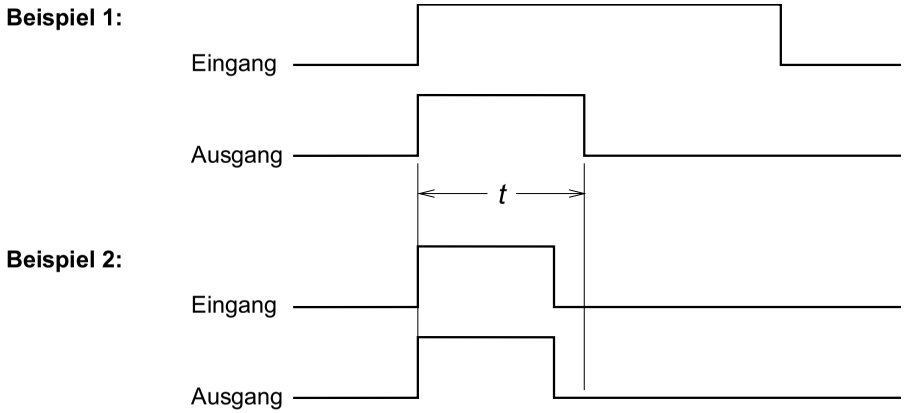


Beispiel 2:



Function 2 = pulse

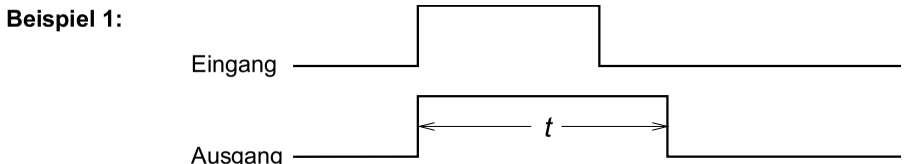
Beispiel 1:



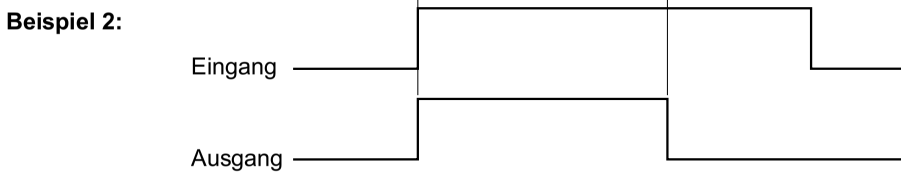
Beispiel 2:

Function 3 = extended pulse

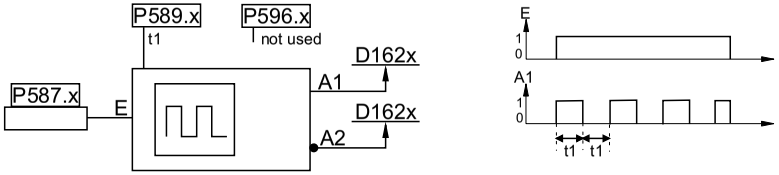
Beispiel 1:



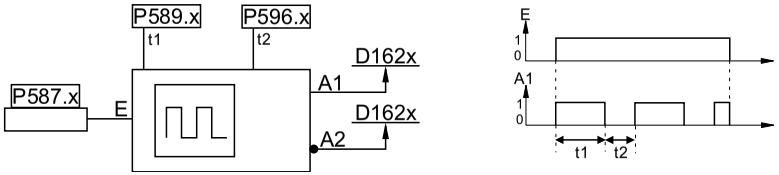
Beispiel 2:



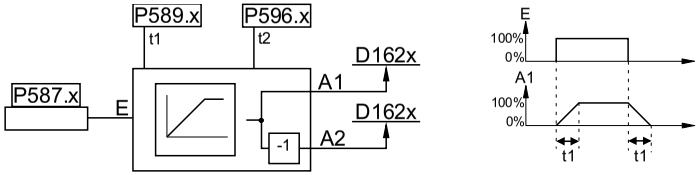
Function 4 = pulse generator, symmetrical



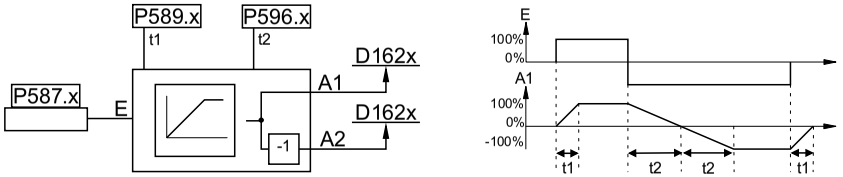
Function 5 = pulse generator, non-symmetrical



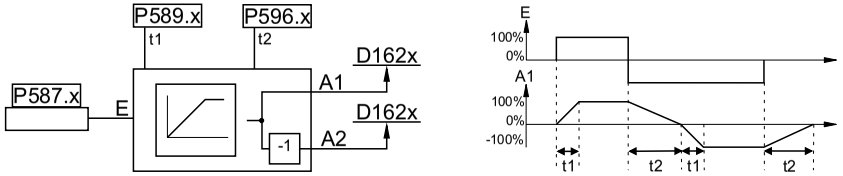
Function 6 = ramp-function generator, symmetrical



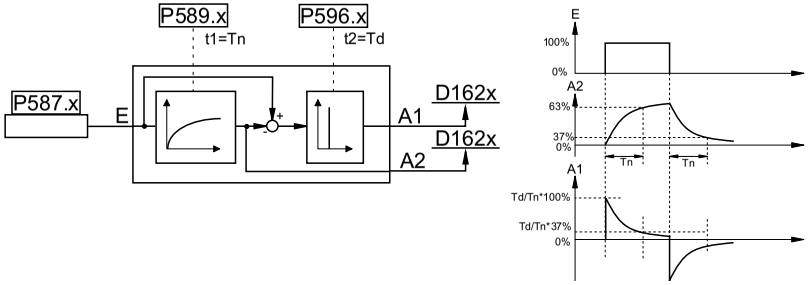
Function 7 = ramp-up generator, M direction / sign

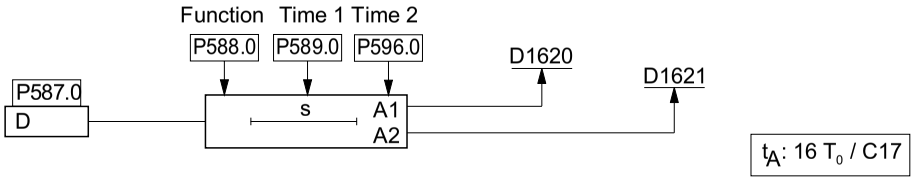


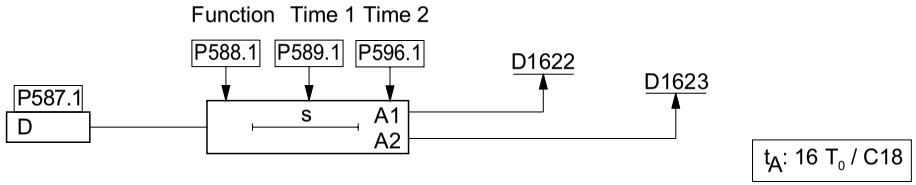
Function 8 = ramp-up generator, n direction / absolute value

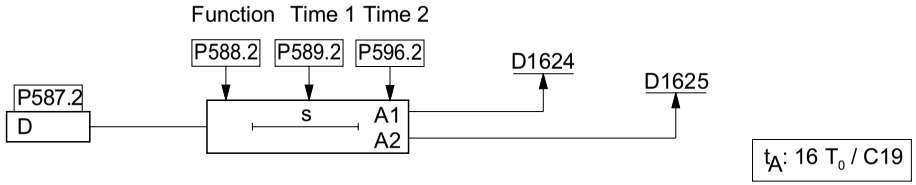


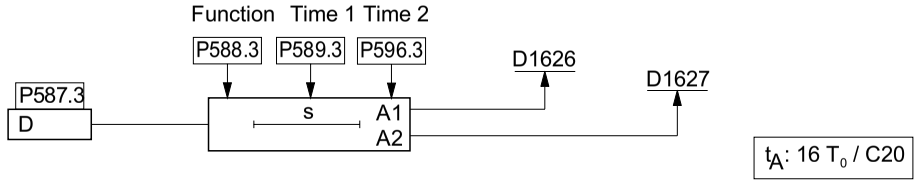
Function 9 = differential element, DT1 characteristics











1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Timer elements	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **46**

Parameterizable stepping controller

A universal stepping controller is integrated to be able to implement universal sequence controls.
The stepping controller has a maximum scope of 16 steps, which can be separately parameterized.

Basic step structure

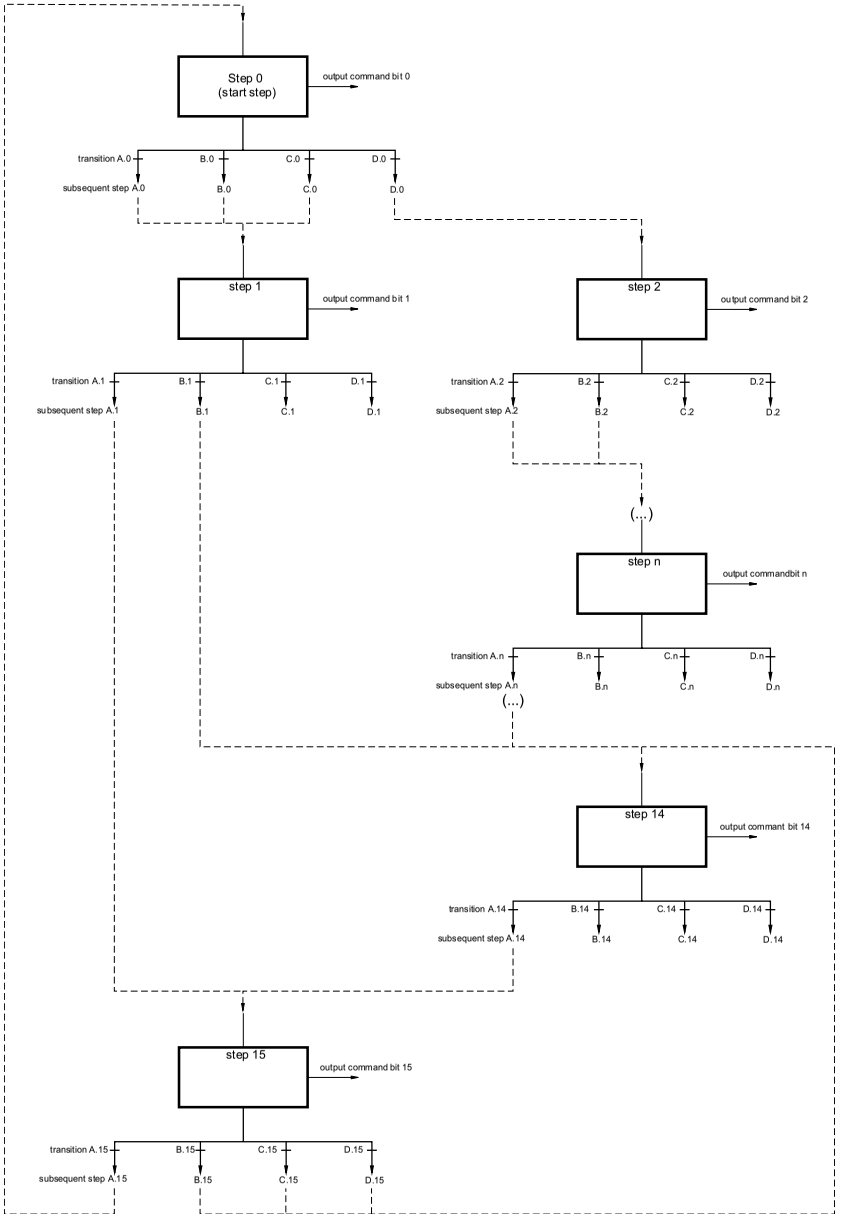
Each step comprises a defined status which is assigned to a parameterizable bit control word (P1266.n). Transitions (transition conditions) must be defined for a step change. Every transition is assigned a subsequent step, so that branches can be implemented.

This is output at D1536, as long as the appropriate status is active.

If a transition A, B, C or D is fulfilled, the step sequence jumps to the subsequent step, corresponding to the appropriate transition. If several transitions are simultaneously fulfilled, the step is made corresponding to the transition with the highest priority. Transition A has the highest priority, transition D, the lowest.

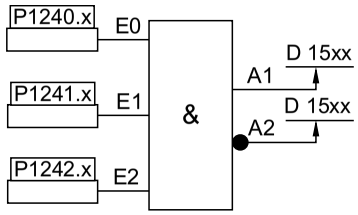
It is permissible to assign several transitions to the same subsequent step (OR logic operation).

A transition is defined by parameterizing a bit mask (P1258.n, P1260.n, P1262.n and P1264.n). Every bit of this mask is assigned the result of the logic modules. The input conditions are logically combined with the logic modules.

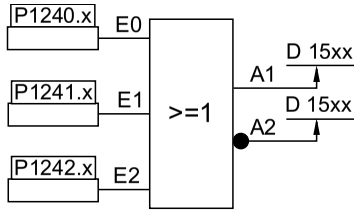


Functions of the logic modules of the stepping controller

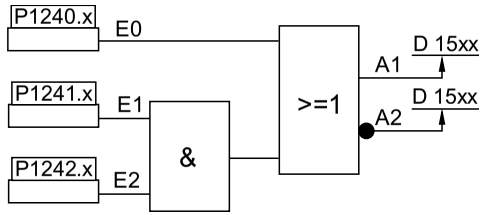
Function No. 0: P1234 = AND E1 * E2 * E3



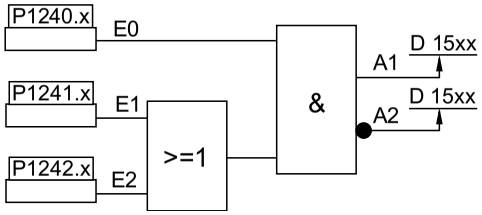
Function No. 1: P1234 = OR E1 + E2 + E3



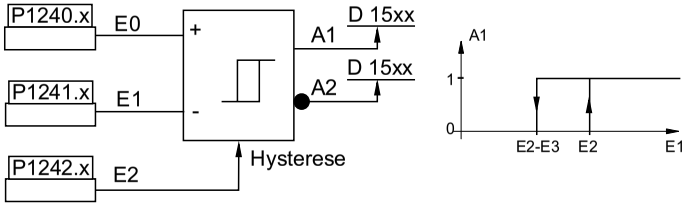
Function No. 2: P1234 = AND-OR

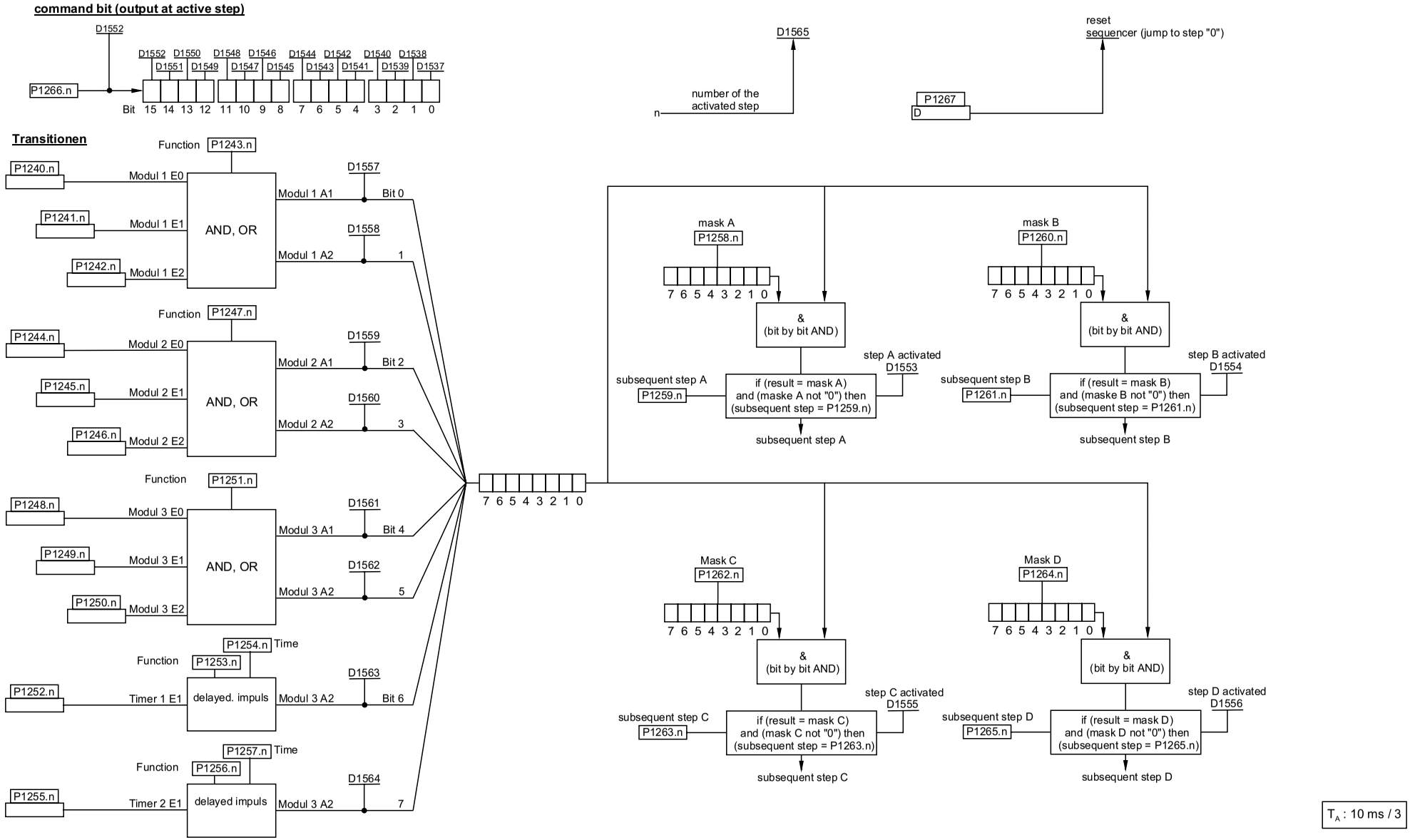


Function No. 3: P1234 = OR-AND



Function No. 4: P1234 = Comparator E1 > E2





1	2	3	4	5	6	7	8

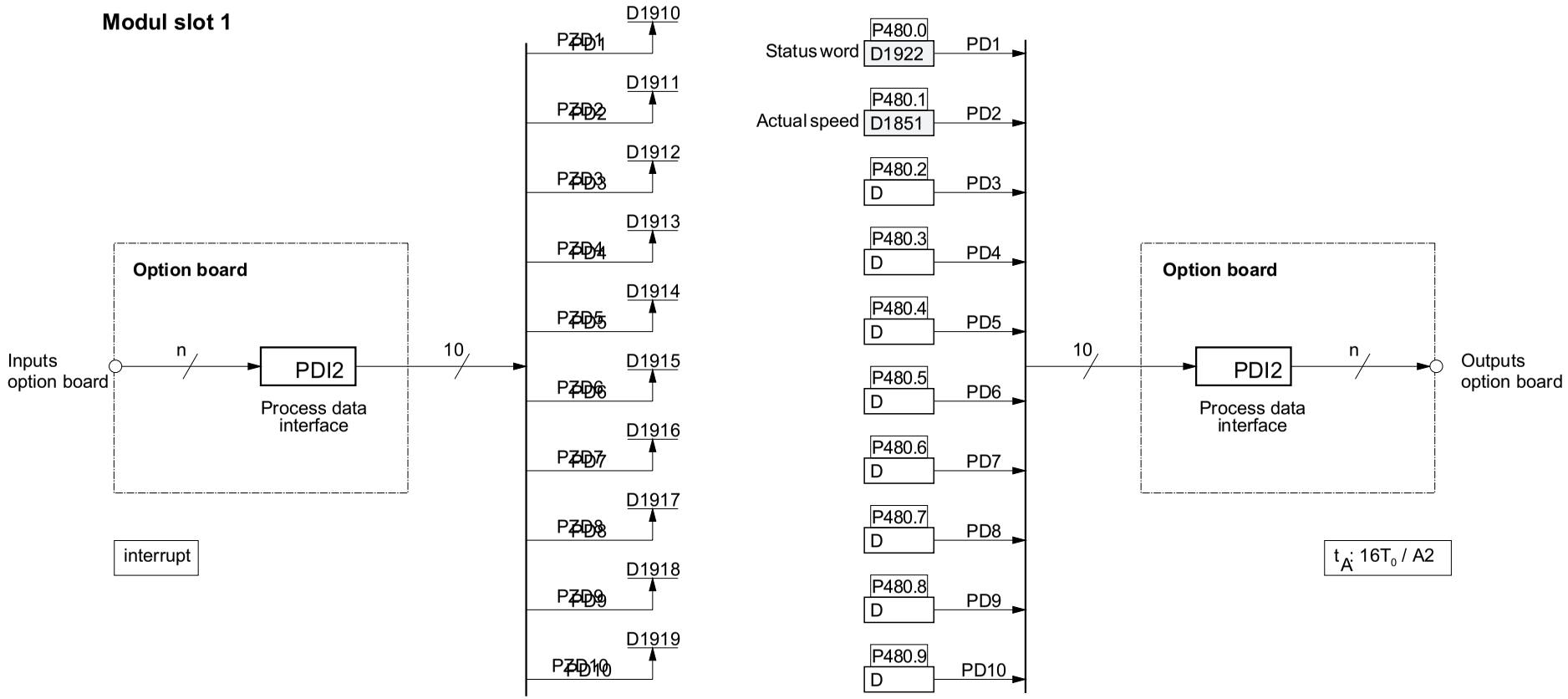
Function diagram **REFUdrive 500 - RD52** Stepping controllers	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **47**

Module location 1

Communications between the “Control board” (SR 17002) and the option card are established via the process data interface. Module location 1 is the standard location for serial interface cards. However, an option card can be inserted at each of the two option slots of the “Control board”.
An option card at slot 1 is addressed from the firmware as interface 2 (SI2).

Communications of a serial interface card via the process data interface SI2

The process data, received via the serial protocol of the interface, is converted to the process data channels of the SI2, and is available in the drive converter as D parameters. It can then be freely connected to the variable parameter sources to control (open-loop) the unit.
The drive converter sends its actual values as process data via the SI2, by connecting D parameters into the variable parameter sources for output SI2.



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Process data, interface SI2	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **48**

Module location 2

Communications between the “Control board” (SR 17002) and the option card are established via the process data interface. Module location 2 is the standard location for the terminal strip expansion (KL17037). However, an option card can be inserted at each of the two option slots of the “Control board”.
An option card at location 2 is addressed from the firmware as interface 4 (SI4).

Communications of the terminal strip expansion via the process data interface SI4

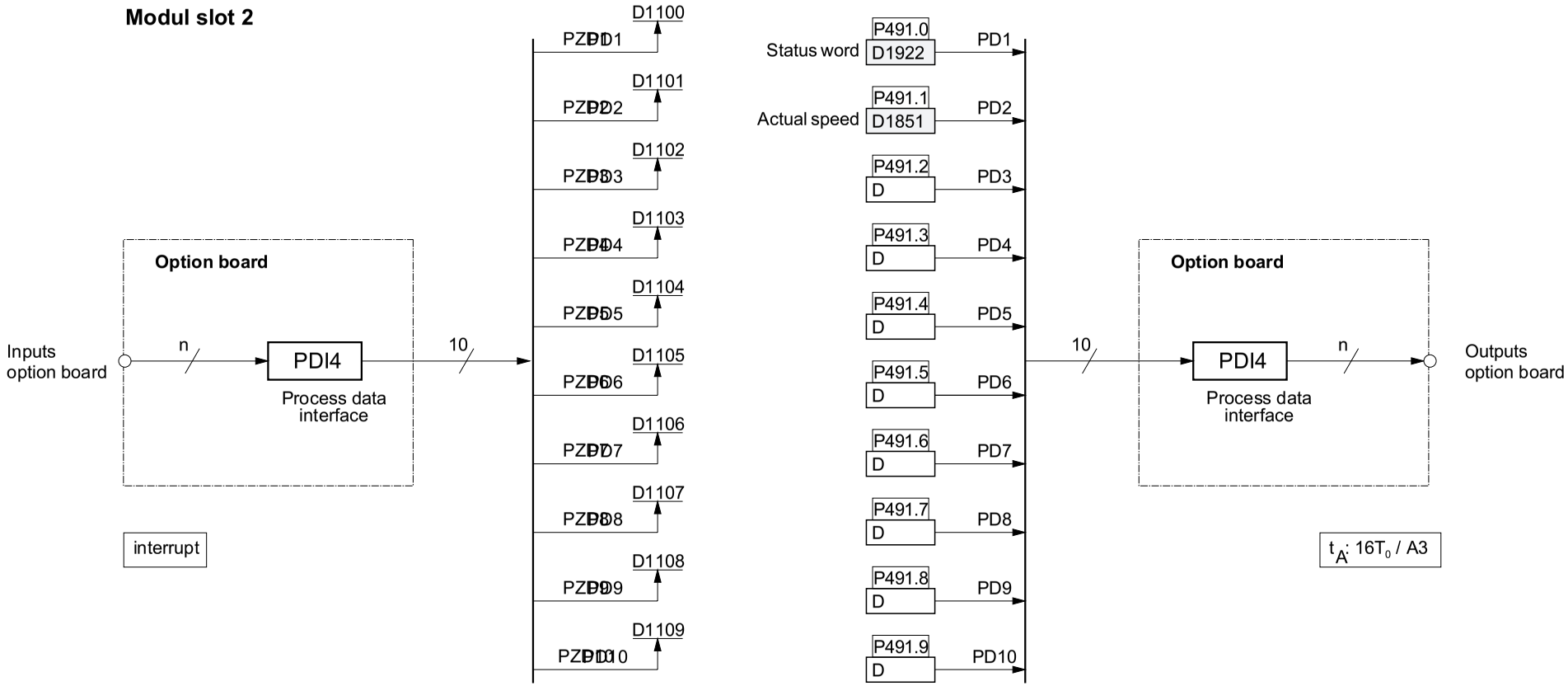
The digital inputs of the terminal strip expansion are converted on the process data channels of SS4 and are available as D parameters.

Option input	Proc. data channel	D parameter
Digital input 1	PZD1 from SI4	D1100
Digital input 2	PZD2 from SI4	D1101
Digital input 3	PZD3 from SI4	D1102
Digital input 4	PZD4 from SI4	D1103

The analog input of the terminal strip expansion is permanently connected to the firmware module for the analog input of module location 2 and is available as D1806, refer to Function Chart 08.

Signals are connected to digital and analog outputs, by connecting the appropriate D parameters into the variable parameter sources of output SI4.

Option output	Proc. data channel	Var. parameter source
Relay output 1	PZD1 from SI4	P491.0
Relay output 2	PZD2 from SI4	P491.1
Relay output 3	PZD3 from SI4	P491.2
Relay output 4	PZD4 from SI4	P491.3
Analog output 1	PZD5 from SI4	P491.4
Analog output 2	PZD6 from SI4	P491.5



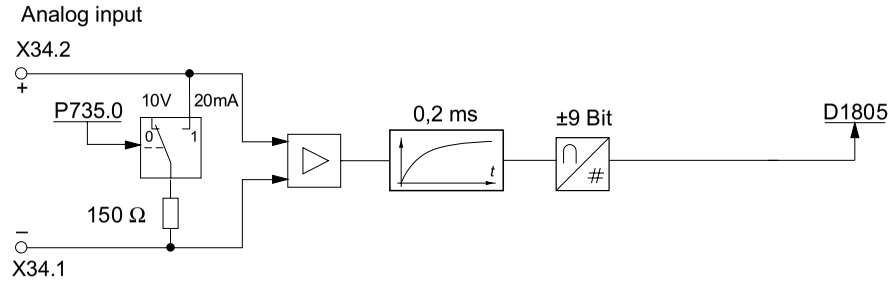
1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Process data, interface SI4	Rexroth Indramat		Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **49**

Module locations for the extended control terminal strip

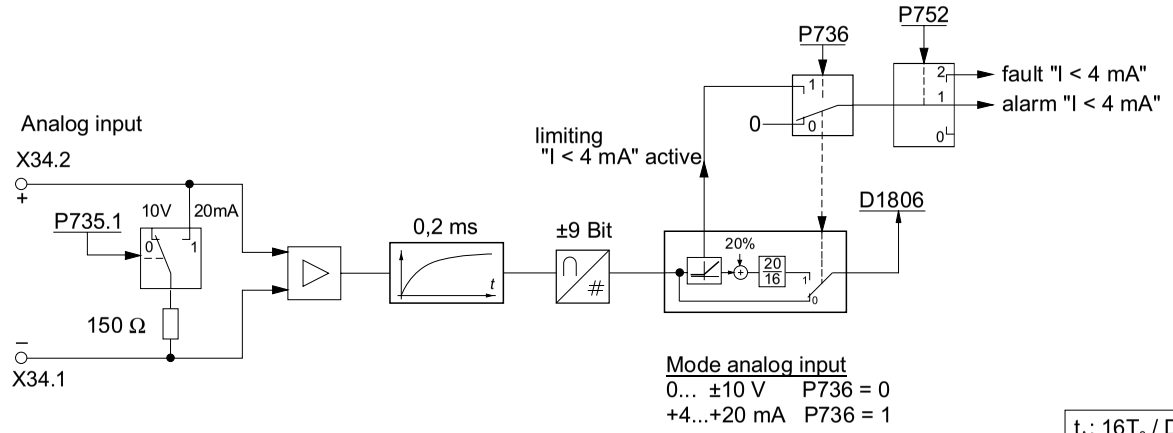
The SR 17002 control board has 2 module locations. A firmware module is provided for an analog input for each module location. In this case, the expanded control terminal strip option must be installed in the unit. The setpoint of the optional analog inputs (D1805 or D1806) can be further processed using the input blocks (function chart, Sheet 09).

Terminal strip extension KL17037 at option slot 1



t_A: $16T_0$ / D14

Terminal strip extension KL17037 at option slot 2



Mode analog input
0... ±10 V P736 = 0
+4...+20 mA P736 = 1

t_A: $16T_0$ / D15

1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Analog inputs (extended control terminal strip)	Rexroth Indramat	Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **50**

Interface description

Option board SL21058 (SynchroLink) is required to activate interface SS7. This board can be inserted both at module location 1 or 2. The process data parameters are not changed as a result of this. Parameters from SS2 and SS4 are not valid for SynchroLink.

Interface structure
10 pieces of process data, 16-bit wide can be transferred. It is possible to combine process data to form 32-bit wide data. A maximum of four 32-bit process data and two 16-bit process data can be configured.

Example of data transfer
When sending, PZD1 should be transferred as a 32-bit value and PZD3, PZD4 and PZD5 as 16-bit value.
Furthermore, when receiving PZD1 this should be interpreted as 32-bit value, and PZD3, PZD4 and PZD5, as 16-bit value.

SENDING

⇒ In order that PZD1 (P493.0) is recognized as 32-bit value, D1800 must be written into P493.1. The other PZDs are automatically recognized as 16-bit value.

RECEIVING

⇒ In order that PZD1 (D1130) is recognized as 32-bit value, it must be connected with a source parameter which is 32 bit wide.

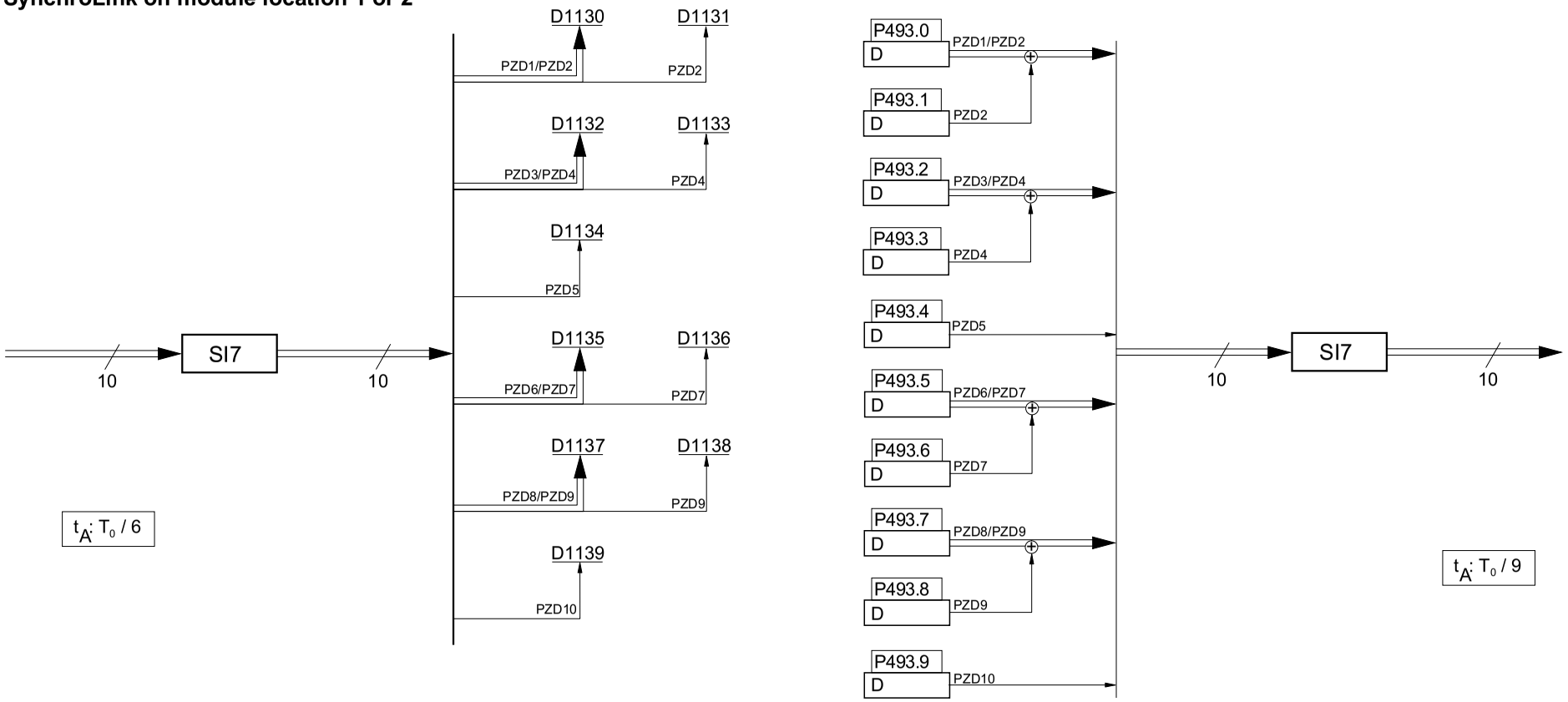
⇒ In order that PZD3 (D1132) is recognized as 16-bit value, it must be connected with a source parameter, which is also only 16 bit wide.

⇒ PZD4 (D1133) and PZD5 (D1134) are already defined as 16 bit-wide data.
Note: The lower 16 bit of the 32-bit value from D1131 are located in D1130.

Interface monitoring
The SynchroLink interface is monitored using parameters P496 and P497. To do this, the “Rx monitoring time” is set in 1 ms increments in P497. The shortest monitoring time is 1 ms, the longest monitoring time is 60 seconds.
If data transfer is not recognized in the selected time, the action, which is activated in P496, is executed. P496 (Rx monitoring mode) provides 5 various actions.

No action	Monitoring is not active
Warning	The unit initiates a warning
Fault	The unit issues a warning
Warning & Clear Data	A warning is initiated and parameters D1130 to D1139 are set to 0x0000.
Fault & Clear Data	A fault is initiated and parameters D1130 to D1139 are set to 0x0000.

SynchroLink on module location 1 or 2

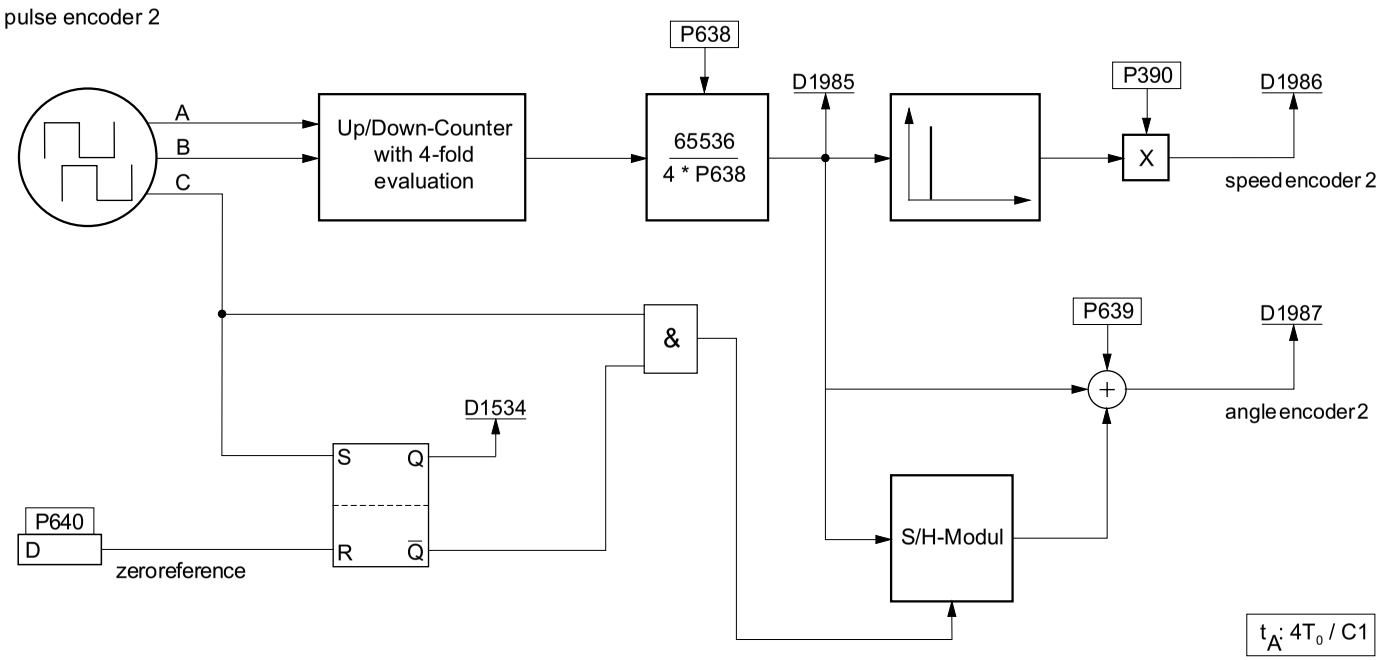


Encoder input 2 for option G1 / G3

The encoder input (pulse encoder 2) is evaluated via parameters P637 ... P640:

P637: Selects the special function, encoder 2
P638: Pulse number, pulse encoder 2nd value range 100 ... 8000
P639: Offset for angle, encoder 2
P640: Input (source) for zero pulse reset

The following function module is only processed when appropriately selected via P637 (as for the position controller). It is processed in time sector 4 T_0-C, directly in front of the position controller.



1	2	3	4	5	6	7	8

Function diagram **REFUdrive 500 - RD52** Encoder card G1/G3 - Encoder input 2	Rexroth Indramat	Date: 2001-01-15	Firmware: FWC-SR1700-200-04VRS-MS	Sheet No. **52**

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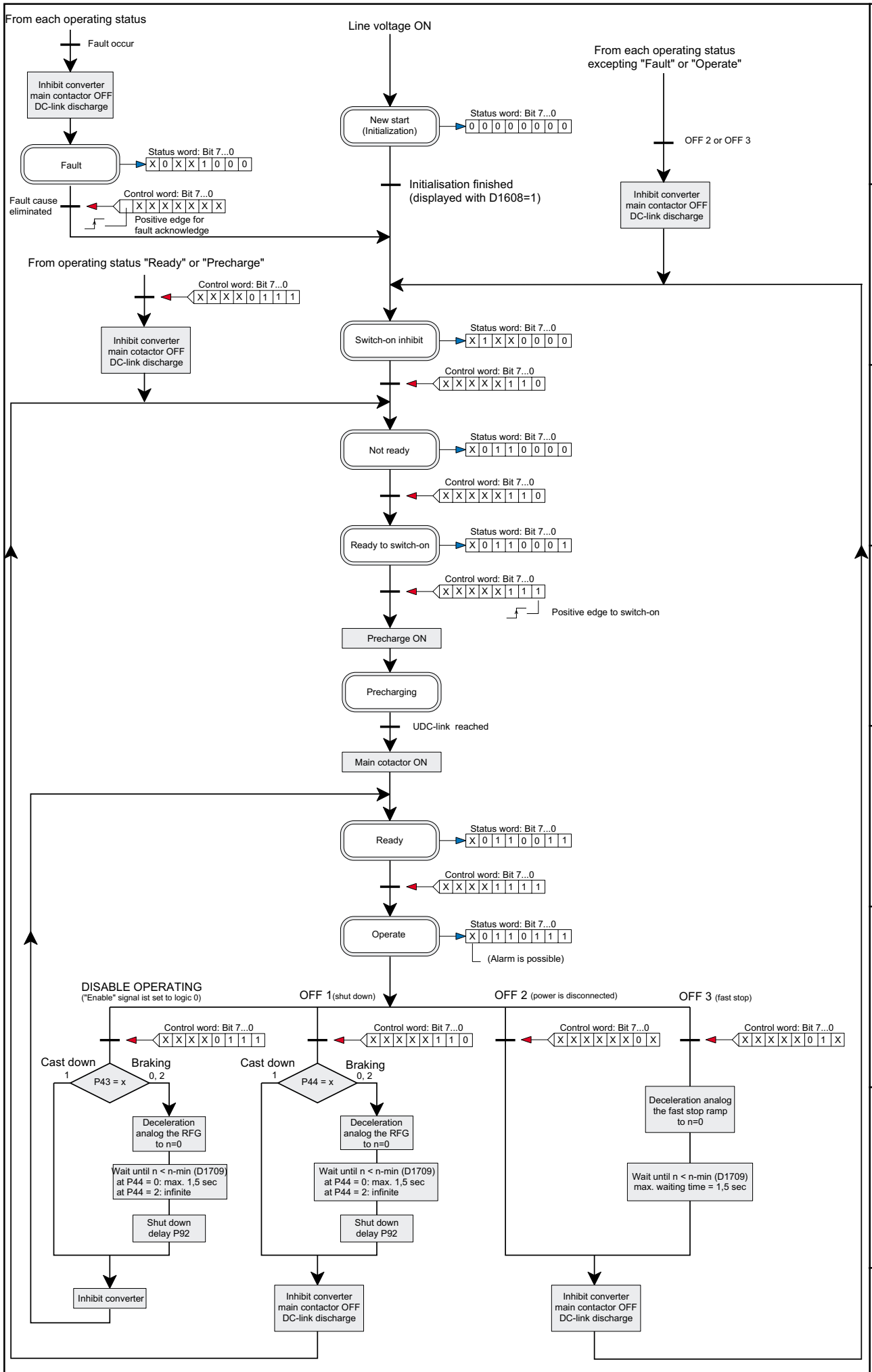

Control word: D1920 (refer sheet No. 02)

Status word: D1922 (refer sheet No. 03)

Sheet No. **53**

Firmware: FWC-SR1700-200-04VRS-MS

Date: 2001-01-15

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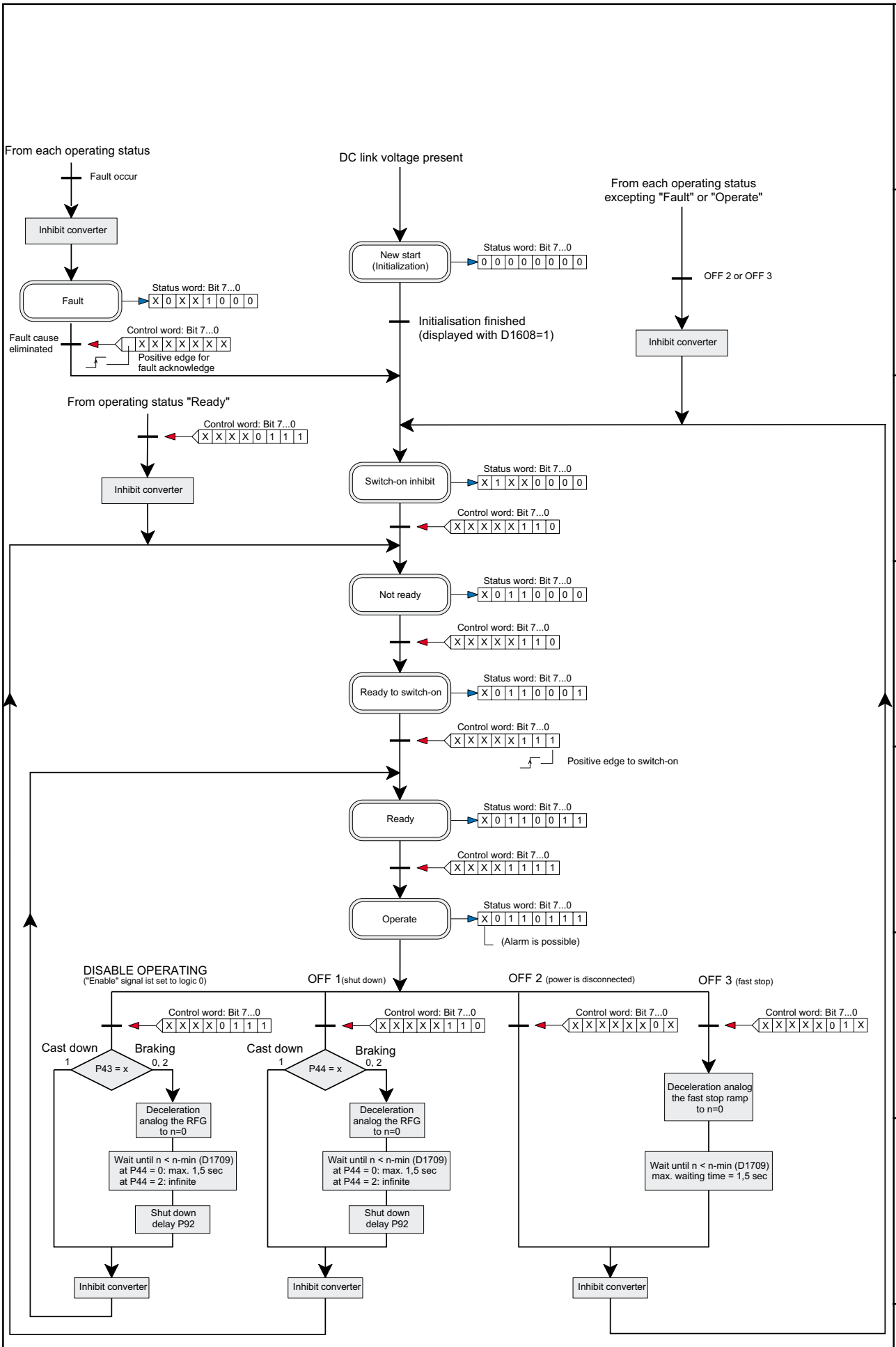
Function diagram **REFUdrive 500 - RD52**

Control and status word diagram, drive converter



Control word: D1920 (refer sheet No. 02)

Status word: D1922 (refer sheet No. 03)

Sheet No. **54**

Firmware: FWC-SR1700-200-04VRS-MS

Date: 2001-01-15

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Function diagram **REFUdrive 500 - RD52**
Control and status word diagram, inverter

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