Function Manual 03/2006 Edition

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SINAMICS - Free Blocks

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Function Manual Free Blocks

Manual

Valid for

Drive	Firmware release
SINAMICS	2.4

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03.2006 Edition

Safety guidelines

This Manual contains information which you should carefully observe to ensure your own personal safety and the prevention of material damage. Notices which are relevant to your own personal safety are highlighted by a safety alert symbol; notices which are relevant only to equipment and property damage have no safety alert symbol. These notices shown below are graded according to the level of danger.

Danger

indicates that death or serious injury **will** result if proper precautions are not taken.

Warning

indicates that death or serious injury **may** result if proper precautions are not taken.

Caution

with a safety alert symbol, indicates that minor personal injury **may** result if proper precautions are not taken.

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Notice

indicates that an unintended result or situation can occur if the corresponding information is not taken into account.

If more than one level of danger exists, the warning notice for the highest level of danger is used. A warning notice accompanied by a safety alert symbol indicating a risk of bodily injury can also indicate a risk of property damage.

Qualified personnel

The associated device/system may only be set up and operated using this documentation. Only **qualified personnel** should be allowed to commission and operate the device/system. Qualified persons are defined as persons who are authorized to commission, to ground, and to tag circuits, equipment, and systems in accordance with established safety practices and standards.

Correct usage

Please note the following:

Warning

The equipment may only be used for single purpose applications explicitly described in the catalog and in the technical description and it may only be used along with third-party devices and components recommended by Siemens.

This product can only function correctly and safely if it is transported, stored, set up, and installed correctly, and operated and maintained as recommended.

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Preface

Information about the SINAMICS documentation

The SINAMICS documentation is organized in two parts:

- General documentation / catalogs
- Manufacturer/service documentation

This documentation is part of the technical customer documentation for SINAMICS.

In the interests of clarity, this documentation does not contain all the detailed information for all product types and cannot take into account every possible aspect of installation, operation, or maintenance.

The contents of this documentation are not part of an earlier or existing agreement, a promise, or a legal agreement, nor do they change this. All obligations entered into by Siemens result from the respective contract of sale that contains the complete and sole valid warranty arrangements. These contractual warranty provisions are neither extended nor curbed as a result of the statements made in this documentation.

Audience

This documentation is aimed at commissioning engineers and service personnel who use SINAMICS.

Objective

This manual contains the comprehensive information about parameters, function diagrams and faults and alarms required to commission and service the system.

It must be used as a supplementary document to the other manuals and tools available for the product.

Search aids

The following aids are provided to help you locate information in this manual:

1. Table of contents
   - General table of contents for complete manual (after the preface).
   - Directory for the function diagrams (Section 3.1).
2. List of Abbreviations
3. Index

Technical support

Should you have any questions about our products and systems, then please contact the following hotline:

European and African time zones

Tel.	+49 (0) 180 5050 - 222
Fax:	+49 (0) 180 5050 - 223
Internet:	http://www.siemens.com/automation/support-request

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American time zones

Tel.	+1 423 262 2522
Internet:	http://www.siemens.com/automation/support-request

Note:

Country telephone numbers for technical support are provided under the following Internet address:

http://www.siemens.com/automation/service&support

Product information

Information about SINAMICS can be found on the Internet at the following address:

http://www.siemens.com/sinamics

Contents

General Description 1

Content

1.1 Overview of free blocks

1.1.1 Field of application, features

A combinational logic is required for a number of applications for the control of the drive system, which links various states (e.g. access control, plant status) to a control signal (e.g. ON command).

In addition to logic combinations, math instructions or storage elements are increasingly required in drive systems.

This functionality is available as a "Free blocks" function module on nearly every drive object of the drive system.

Each "Free blocks" function module is activated on the individual drive object. The free blocks can be activated simultaneously on several drive objects on a control module.

The free blocks can be activated on the following drive object types:

Table 1-1 Drive object types for "free blocks"

Drive object type	Object number (p0107)	Meaning
CU_S	1	Control Unit SINAMICS S (SINAMICS S120/S150)
CU_G	2	Control Unit SINAMICS G (SINAMICS G130/G150)
CU_I	3	Control Unit SINAMICS Integrated (only SM150)
CU_CX32	4	Controller extension to extend the computer performance (only for operation on SM150)
A_INF	10	Active Infeed closed-loop control Regulated, self-commutated infeed/regenerative feedback unit for generating a constant DC-link voltage.
SERVO	11	Servo drive
VECTOR	12	Vector drive
VECTORMV	13	Vector drive for SINAMICS GM
S_INF	20	Smart Infeed closed-loop control Unregulated line infeed/feedback unit for generating the DC link voltage.
B_INF	30	Basic Infeed closed-loop control Unregulated line infeed unit (without feedback) for rectifying the line voltage of the DC Link.
A_INFMV	40	Active Infeed closed-loop control for SINAMICS SM150
B_INFMV	41	Basic Infeed closed-loop control for SINAMICS GM150

Table 1-1 Drive object types for "free blocks"

Drive object type	Object number (p0107)	Meaning
TB30	100	Terminal Board 30
TM31	200	Terminal Module 31
TM41	201	Terminal Module 41
TM15DI/DO	204	Terminal Module 15 (for SINAMICS)

Analog signals are treated as dimensionless percentage variables in the free blocks (see Section 1.1.7)

Note

This additional functionality increases the computation time load. This may restrict the maximum possible configuration with a control module (see Section 1.2.3).

1.1.2 Configuration and operation

The free blocks are configured on the parameters level. The following parameters are required for this:

- Input parameters (e.g. Inputs I0 ... I3 for the AND function block).
- Output parameters (e.g. Output Y for the numeric selector).
- Adjustable parameters (e.g. the pulse duration for the MFP pulse generator).
- Execution group (this contains the sampling time; the free blocks are not computed with the factory setting).
- Execution sequence within the execution group.

Each input, output and adjustable variable is assigned a parameter. These can be accessed with the Advanced Operator Panel (AOP) and with the STARTER commissioning software. In principle, the "free blocks" can be interconnected on the BICO level.

The "free blocks" do not support data set dependency.

1.1.3 Execution group, sampling time and execution sequence

Execution groups

Execution groups are groups of free blocks within the system that are computed in the same sampling time and at a certain time.

There are a total of 10+1 "execution groups" available (execution groups 0 to 9 and execution group 9999 (= execution group is not computed)); their sampling time can be set within certain limits.

Each function block is assigned exactly via a parameter to an execution group. With the factory setting, this is the value 9999 for each function block (i.e. the function block is not computed).

Example:

The execution group in p20096 is set for function block ADD 0 (see Section 3.4, function diagram 7220).

The execution groups are divided in to a "fixed execution group" and several "free execution groups".

- The "fixed execution group" is called at a fixed position in the system sequence.
  The only fixed execution group in firmware version V2.4 (p20000[x] = 9003) is arranged before the setpoint channel and is computed in the sampling time of the setpoint channel (p0115[3]).
  This adjustable value is only available for the drive object types SERVO, VECTOR and VECTORMV.
- The "free execution groups" are only defined via their sampling time.

Note

If two or more execution groups are assigned the same sampling time (the same fixed or free execution group), the execution groups are executed in the sequence of their numbering.

Example:

p20000[0] = p20000[3] = p20000[9] = 9003
The computation sequence is:
First execution group 0, then execution group 3, then execution group 9 and then the setpoint channel.

The smallest settable sampling time is 1 ms. If in the case of the fixed execution group (p20000[x] = 9003) the sampling time of the setpoint channel p0115[3] is set to < 1 ms, the execution group is still called with a sampling time of 1 ms.

The currently set sampling time in ms is displayed for each execution group in parameter r20001[0...9].

With the factory setting, no execution group is called (p20000[x] = 0).

Sampling times

There are two types of sampling times for the execution groups:

- Sampling times that are generated in the hardware:

  With the hardware sampling times, each integer multiple of the base sampling time (can be read in r20002) in the range from 1 x r20002 to 256 x r20002 can be generated in p20000[0...9] with the following limits:
  Minimum sampling time = 1 ms
  Maximum sampling time = r20003 (approx. 8 ms)

Note

In the offline configuration with the STARTER commissioning software, a value of 0 ... 256 can be entered in p20000[x], even when the above limits for the hardware sampling times of 1 ms ... r20003 are violated. This is only detected after the download from the control module and results in fault F01042 (parameter error during project download).

  This base sampling time results for various drive object types as follows:

  – SERVO, VECTOR, VECTORMV, A_INF, S_INF drive object:
    r20002 = current controller sampling time
  – B_INF drive object:
    r20002 = 2 ms (= current controller sampling time)
  – A_INFMV, B_INFMV drive object:
    r20002 = 0.5 ms (= current controller sampling time)
  – TM15, TM31, TM41, TB30 drive object:
    r20002 = 4 ms
  – CU_S, CU_G, CU_I and CX32 drive object (only with SM150):
    r20002 = 4 ms

- Sampling times that are generated in the software:

  These sampling times are generated as integer multiples of the base value for software sampling times; they can be read out in parameter r20003 with activated "Free blocks" function module.

  The possible values for the software sampling times can be taken from the parameter description (see Section 2.2).

Note

With p20000[x] = 0, the relevant execution group (and all its assigned function blocks) is not computed.

The sampling time of execution group x is displayed in r20001[x] in ms.

Examples of settable sampling times:

- SINAMICS G or SINAMICS S:
  Vector drive (400 V, 250 kW, Chassis type, pulse frequency 2 kHz) or Active Line Module, Chassis type, 400 V, frame size FX, GX:

  The base sampling time (r20002) is 250 µs and therefore the following sampling times are possible:

  – Hardware sampling times:
    p20000[x] = 0 (is not computed)
    p20000[x] = 1 x 250 µs = 250 µs (not permitted as less than 1 ms)
    p20000[x] = 2 x 250 µs = 500 µs (not permitted as less than 1 ms)
    p20000[x] = 3 x 250 µs = 750 µs (not permitted as less than 1 ms)
    p20000[x] = 4 x 250 µs = 1000 µs
    p20000[x] = 5 x 250 µs = 1250 µs
    ...
    p20000[x] = 32 x 250 µs = 8000 µs
    p20000[x] = 33 x 250 µs = 8250 µs (is rejected as greater than 8 ms!)
    All following settings are not possible as the sampling times would be greater than 8 ms.

    The base value of the software sampling time is: r20003 = 8 ms.

  – Software sampling times:
    p20000[x] = 1002: Sampling time = 2 x 8 ms = 16 ms
    p20000[x] = 1003: Sampling time = 3 x 8 ms = 24 ms
    p20000[x] = 1004: Sampling time = 4 x 8 ms = 32 ms
    p20000[x] = 1005: Sampling time = 5 x 8 ms = 40 ms
    p20000[x] = 1006: Sampling time = 6 x 8 ms = 48 ms
    p20000[x] = 1008: Sampling time = 8 x 8 ms = 64 ms
    p20000[x] = 1010: Sampling time = 10 x 8 ms = 80 ms
    p20000[x] = 1012: Sampling time = 12 x 8 ms = 96 ms
    p20000[x] = 1016: Sampling time = 16 x 8 ms = 128 ms
    p20000[x] = 1020: Sampling time = 20 x 8 ms = 160 ms
    p20000[x] = 1024: Sampling time = 24 x 8 ms = 192 ms
    p20000[x] = 1032: Sampling time = 32 x 8 ms = 256 ms
    p20000[x] = 1040: Sampling time = 40 x 8 ms = 320 ms
    p20000[x] = 1048: Sampling time = 48 x 8 ms = 384 ms
    p20000[x] = 1064: Sampling time = 64 x 8 ms = 512 ms
    p20000[x] = 1096: Sampling time = 96 x 8 ms = 768 m

Note

The missing intermediate values are not permitted because of the system.

- SINAMICS G or SINAMICS S:
  Motor Module (690 V, 90 kW, Chassis type, pulse frequency 1.25 kHz) or Active Line Module, Chassis type, 400 V, frame size HX, JX or Active Line Module, Chassis type, 690 V, frame size FX, GX, HX, JX:

  The base sampling time (r20002) is 400 µs and therefore the following sampling times are possible:

  – Hardware sampling times:
    p20000[x] = 0 (is not computed)
    p20000[x] = 1 x 400 µs = 400 µs (not permitted as less than 1 ms)
    p20000[x] = 2 x 400 µs = 800 µs (not permitted as less than 1 ms)
    p20000[x] = 3 x 400 µs = 1200 µs
    p20000[x] = 4 x 400 µs = 1600 µs
    ...
    p20000[x] = 20 x 400 µs = 8000 µs
    p20000[x] = 21 x 400 µs = 8400 µs (is rejected as greater than 8 ms!)
    All following settings are not possible as the sampling times would be greater than 8 ms.

    The base value of the software sampling time is: r20003 = 8 ms.

  – Software sampling times:
    p20000[x] = 1002: Sampling time = 2 x 8 ms = 16 ms
    p20000[x] = 1003: Sampling time = 3 x 8 ms = 24 ms
    p20000[x] = 1004: Sampling time = 4 x 8 ms = 32 ms
    p20000[x] = 1005: Sampling time = 5 x 8 ms = 40 ms
    p20000[x] = 1006: Sampling time = 6 x 8 ms = 48 ms
    p20000[x] = 1008: Sampling time = 8 x 8 ms = 64 ms
    p20000[x] = 1010: Sampling time = 10 x 8 ms = 80 ms
    p20000[x] = 1012: Sampling time = 12 x 8 ms = 96 ms
    p20000[x] = 1016: Sampling time = 16 x 8 ms = 128 ms
    p20000[x] = 1020: Sampling time = 20 x 8 ms = 160 ms
    p20000[x] = 1024: Sampling time = 24 x 8 ms = 192 ms
    p20000[x] = 1032: Sampling time = 32 x 8 ms = 256 ms
    p20000[x] = 1040: Sampling time = 40 x 8 ms = 320 ms
    p20000[x] = 1048: Sampling time = 48 x 8 ms = 384 ms
    p20000[x] = 1064: Sampling time = 64 x 8 ms = 512 ms
    p20000[x] = 1096: Sampling time = 96 x 8 ms = 768 m

Note

The missing intermediate values are not permitted because of the system.

- SINAMICS S:
  Basic Line Module, Chassis:

  The base sampling time (r20002) is 2 ms and therefore the following sampling times are possible:

  – Hardware sampling times:
    p20000[x] = 0 (is not computed)
    p20000[x] = 1 x 2 ms = 2 ms
    p20000[x] = 2 x 2 ms = 4 ms
    p20000[x] = 3 x 2 ms = 6 ms
    p20000[x] = 4 x 2 ms = 8 ms
    p20000[x] = 5 x 2 ms = 10 ms (is rejected as greater than 8 ms!)
    All following settings are not possible as the sampling times would be greater than 8 ms.

    The base value of the software sampling time is: r20003 = 8 ms.

  – Software sampling times:
    p20000[x] = 1002: Sampling time = 2 x 8 ms = 16 ms
    p20000[x] = 1003: Sampling time = 3 x 8 ms = 24 ms
    p20000[x] = 1004: Sampling time = 4 x 8 ms = 32 ms
    p20000[x] = 1005: Sampling time = 5 x 8 ms = 40 ms
    p20000[x] = 1006: Sampling time = 6 x 8 ms = 48 ms
    p20000[x] = 1008: Sampling time = 8 x 8 ms = 64 ms
    p20000[x] = 1010: Sampling time = 10 x 8 ms = 80 ms
    p20000[x] = 1012: Sampling time = 12 x 8 ms = 96 ms
    p20000[x] = 1016: Sampling time = 16 x 8 ms = 128 ms
    p20000[x] = 1020: Sampling time = 20 x 8 ms = 160 ms
    p20000[x] = 1024: Sampling time = 24 x 8 ms = 192 ms
    p20000[x] = 1032: Sampling time = 32 x 8 ms = 256 ms
    p20000[x] = 1040: Sampling time = 40 x 8 ms = 320 ms
    p20000[x] = 1048: Sampling time = 48 x 8 ms = 384 ms
    p20000[x] = 1064: Sampling time = 64 x 8 ms = 512 ms
    p20000[x] = 1096: Sampling time = 96 x 8 ms = 768 m

Note

The missing intermediate values are not permitted because of the system.

- SINAMICS G or SINAMICS S:
  Control Unit CU320 or TM31 or TB30:

  The base sampling time (r20002) is 4 ms and therefore the following sampling times are possible:

  – Hardware sampling times:
    p20000[x] = 0 (is not computed)
    p20000[x] = 1 x 4 ms = 4 ms
    p20000[x] = 2 x 4 ms = 8 ms
    p20000[x] = 3 x 4 ms = 12 ms (is rejected as greater than 8 ms!)
    All following settings are not possible as the sampling times would be greater than 8 ms.

    The base value of the software sampling time is: r20003 = 8 ms.

  – Software sampling times:
    p20000[x] = 1002: Sampling time = 2 x 8 ms = 16 ms
    p20000[x] = 1003: Sampling time = 3 x 8 ms = 24 ms
    p20000[x] = 1004: Sampling time = 4 x 8 ms = 32 ms
    p20000[x] = 1005: Sampling time = 5 x 8 ms = 40 ms
    p20000[x] = 1006: Sampling time = 6 x 8 ms = 48 ms
    p20000[x] = 1008: Sampling time = 8 x 8 ms = 64 ms
    p20000[x] = 1010: Sampling time = 10 x 8 ms = 80 ms
    p20000[x] = 1012: Sampling time = 12 x 8 ms = 96 ms
    p20000[x] = 1016: Sampling time = 16 x 8 ms = 128 ms
    p20000[x] = 1020: Sampling time = 20 x 8 ms = 160 ms
    p20000[x] = 1024: Sampling time = 24 x 8 ms = 192 ms
    p20000[x] = 1032: Sampling time = 32 x 8 ms = 256 ms
    p20000[x] = 1040: Sampling time = 40 x 8 ms = 320 ms
    p20000[x] = 1048: Sampling time = 48 x 8 ms = 384 ms
    p20000[x] = 1064: Sampling time = 64 x 8 ms = 512 ms
    p20000[x] = 1096: Sampling time = 96 x 8 ms = 768 m

Note

The missing intermediate values are not permitted because of the system.

Execution sequence

With the factory setting, each free block has a default setting for the execution sequence. These values can be changed to optimize the execution sequence of successive free blocks within an execution group.

A value for the execution sequence may only be used once on a drive object. If the same value for the execution sequence is assigned twice on a drive object, alarm A50513 appears (see Section 4) and the previous value is retained.

The execution sequence can be set between 0 and 32000. Within an execution group, a function block with a smaller value for the execution sequence is computed before one with a larger value.

Note:

If a configuration is created OFFLINE, at first every value can be set for the execution sequence (e.g. a value can also be assigned to several function blocks simultaneously). A check is only performed after the configuration has been loaded to the control module.

After the download, the parameter values are checked in the sequence of the parameter numbers. If it is detected that the execution sequence value of a function block has already been used by another function block, the value is not accepted and alarm A50513 and fault F01042 (message in STARTER: Error has occurred during download) are triggered.

Note

In the OFFLINE configuration, the value range of 10 ... 740 has already been assigned execution sequence values of the function blocks in the factory setting.

With user configurations, for example, only execution sequence values as of 1000 should be used to avoid conflicts with the already assigned values for the execution sequence during the download.

For the processing of signals for a drive object, if possible, only the function blocks on this drive object should be used.

1.1.4 Use of free blocks on several drive objects

When processing signals of a drive object, function blocks on other drive objects with the same sampling time can be used. Whereby dead times can occur that have to be taken into account for time-critical applications.

These dead times at the signal transition between the drive objects depend on the computation sequence of the drive objects.

Example: Signal source and signal sink have the same sampling time.

- If the drive object (DO) of the signal source is computed first and then the drive object of the signal sink, the dead time is almost zero.
- If the drive object of the signal sink is computed first, the signal sink reads in the output value of the signal source of the previous sampling time. The dead time is approximately one sampling time.

The dead time can be ignored when the signals change very slowly in relation to the sampling time.

1.1.5 Computation sequence of execution groups in various drive objects

The computation sequence is only significant for execution groups with the same sampling time.

Execution groups with the same sampling time are computed in the order of their numbers on a drive object. Therefore, first the execution group with the lowest number, then the execution group with the next lowest number etc.

The following applies for two execution groups with the same sampling time and on two different drive objects of the same control module:

1. If both drive objects are of the type A_INF, SERVO, VECTOR, VECTORMV, S_INF, B_INF, A_INFMV or B_INFMV, the execution groups are computed in the order of their drive object numbers (see p0101[0...15]).
2. If both drive objects are of the type CU_S, CU_G, CU_I, CU_CX32, TB30, TM31, TM41 or TM15DI/DO, the execution groups are also computed in the order of their drive object numbers (see p0101[0...15]).
3. If one execution group is on a drive object type listed in 1 and the other execution group is on a drive object type listed in 2, then the execution group of the drive object listed in 1 is executed first.

1.1.6 Range of blocks

The following table shows the range of available free blocks. The special technical features of the individual function blocks can be taken from the function diagrams in Section 3.

Table 1-2 Range of "free blocks"

Short name	Name of the function block	Data type	Number per drive object
AND	AND function block	BOOL	4
OR	OR function block	BOOL	4
XOR	XOR function block	BOOL	4
NOT	Inverter	BOOL	4
ADD	Adder	REAL	2
SUB	Subtracter	REAL	2
MUL	Multiplier	REAL	2
DIV	Divider	REAL	2
AVA	Absolute value generator with sign evaluation	REAL	2
MFP	Pulse generator	BOOL	2
PCL	Pulse contractor	BOOL	2
PDE	ON delay	BOOL	2
PDF	OFF delay	BOOL	2
PST	Pulse stretcher	BOOL	2
RSR	RS flip-flop, reset dominant	BOOL	2
DFR	D flip-flop, reset dominant	BOOL	2
BSW	Binary switch	BOOL	2
NSW	Numeric switch	REAL	2
LIM	Limiter	REAL	2
PT1	Smoothing element	REAL	2
INT	Integrator	REAL	1
DIF	Derivative-action element	REAL	1
LVM	Double-sided limit monitor with hysteresis	BOOL	2

1.1.7 Connection to the drive

All connector inputs (CI) and connector outputs (CO) of the free blocks (p20094 ... p20286) are percentage variables. This means that within the free blocks, only percentage signal values are computed (1.0 corresponds to 100 %). Conversion to the connectors of the drive with units is performed automatically.

Note:

Only the function diagrams for "free blocks" are contained in this manual (see Section 3).
The product-dependent function diagrams available for SINAMICS (e.g. function diagram 3010) are listed in the following documents:

References: SINAMICS S List Manual, "Function diagrams" section

References: SINAMICS GM List Manual, "Function diagrams" section

References: SINAMICS SM List Manual, "Function diagrams" section

Example 1 (interconnecting input value)

The current fixed speed setpoint (CO: r1024, function diagram 3010) is to read into the free block ADD 0 (function diagram 7220) and processed further.

p20094[0] = 1024 is set for this.

The function block ADD 0 is to be called cyclically and therefore is to be assigned to execution group 9. It is also to be called with a sampling time of 2 x r20003. The number of the execution group has been selected arbitrarily here.

p20096 = 9 and p20000[9] = 1002 are set for this.

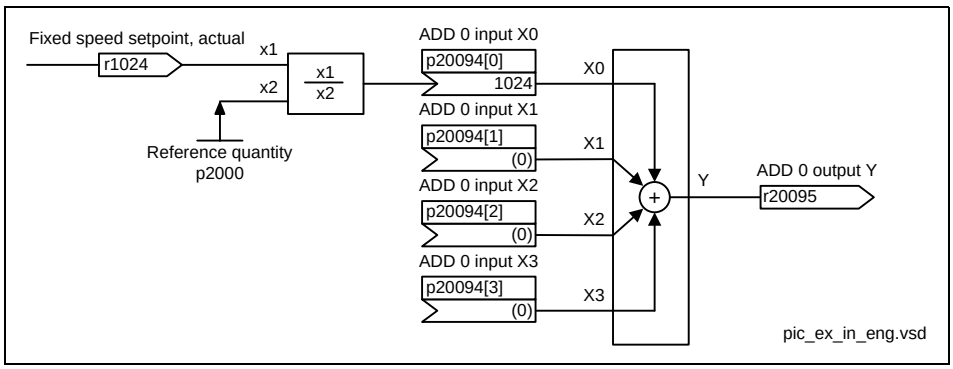

Fig. 1-1 Example 1: Interconnecting input value

The input signal r1024 with the unit rpm is related to its reference value p2000.

Assumption:

- r1024 = 1500 rpm
- p2000 = 3000 rpm reference speed

Result:

- r20095 = 0.5

Example 2 (interconnecting output value)

The percentage output value of the free block LIM 0 (function diagram 7260) is to be switched in as additional torque M_Additional 2 (function diagram 6060) in the VECTOR control mode.

p1513[0] = 20231 is set for this.

The function block LIM 0 is to be called cyclically and therefore is to be assigned to execution group 8.

p20234 = 8 is set for this.

The number of the execution group has been selected arbitrarily here.

The sampling time for the call of LIM 0 is to be 1 ms.

p20000[8] = 4 is set for this (= 4 x r20002 = 4 x 250 µs)

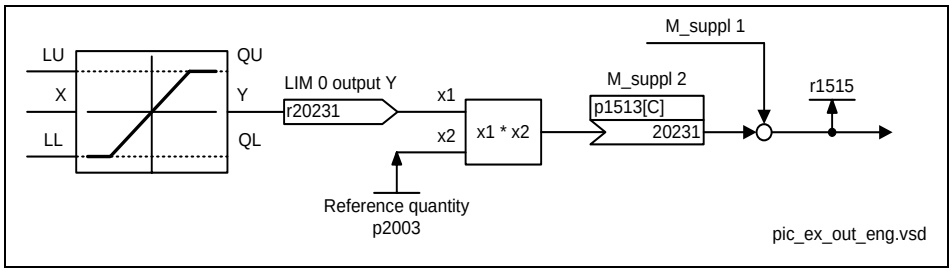

Fig. 1-2 Example 2: Interconnecting output value

The percentage output signal Y of the function block is multiplied internally with the reference torque p2003 through the interconnection of p1513 (additional torque 2) to r20231 and interpreted as additional torque with unit.

Assumption:

- Base sampling time: r20002 = 0.25 ms
- r20231 = 0.3333
- p2003 = 300 Nm reference torque
- p1511[0] = 0 (additional torque 1 = "0")
- p1513[0] = 20231

Result:

- r1515 = 100.0 Nm (for CDS0)

Example 3 (interconnecting PROFIBUS receive word (WORD))

The PZD receive word 2 (CO: r2050[1], function diagram 2460) is to interconnected to the free block ADD 0 (function diagram 7220).

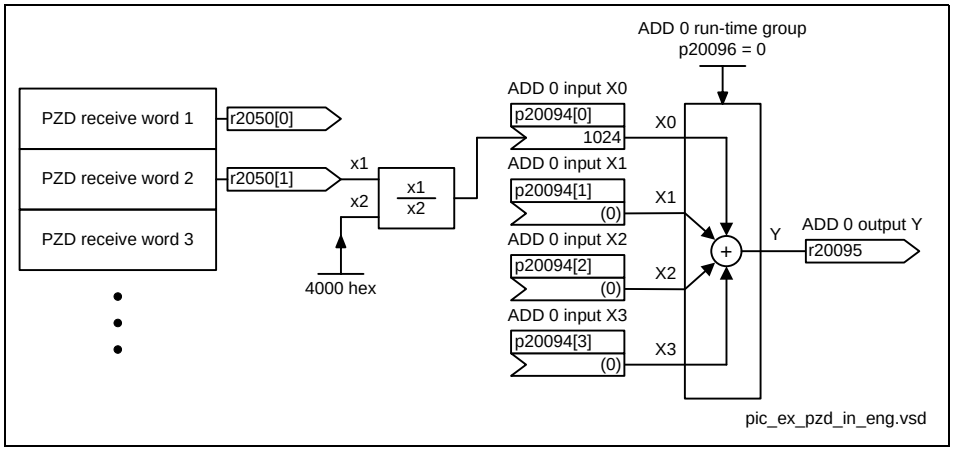

Fig. 1-3 Example 3: Interconnecting PROFIBUS receive word (WORD)

The PROFIBUS process data of data type WORD (16 bits) have the reference value 4000 hex. This reference value corresponds to the value 1.0 at the inputs of the free blocks.

Assumption:

- p20096 = 0

  Assign function block ADD 0 to execution group 0.

- p20000[0] = 1002

  Call execution group 0 with the sampling time 2 x r20003. The number zero for the execution group has been selected arbitrarily.

- PROFIBUS receive word 2: r2050[1] = 6000 hex

Result:

- r20095 = (6000 hex / 4000 hex) x 1.0 = 1.5

Example 4 (interconnecting PROFIBUS send word (DWORD))

The output of the free block LIM 1 (CO: r20234, function diagram 7260) is to be interconnected to the PZD send word (function diagram 2470) of data type DWORD.

The input of the free block LIM 1 is supplied by a fixed speed setpoint (p1002, function diagram 3010).

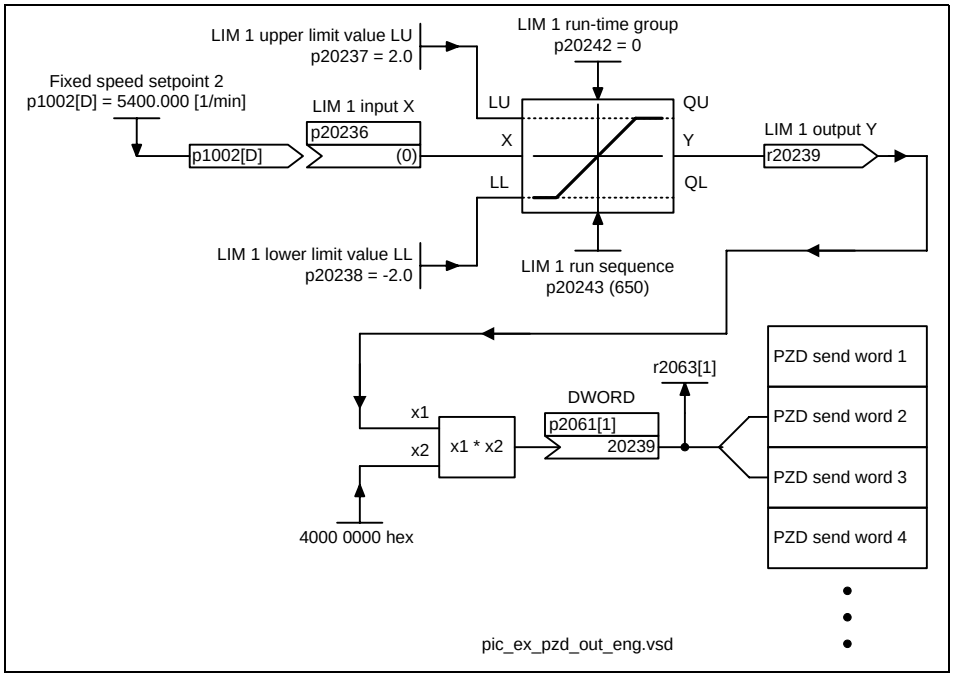

Fig. 1-4 Example 4: Interconnecting PROFIBUS send word (DWORD)

The PROFIBUS process data of data type DWORD (32 bits) have the reference value 4000 0000 hex. This reference value corresponds to the value 1.0 at the outputs of the free blocks. Parameter r2063 is only updated when an actual data exchange is performed at the PROFIBUS.

Assumption:

- p20000[0] = 1002

  Call execution group 0 with the sampling time 2 x r20003. The number zero for the execution group has been selected arbitrarily.

- p1002 = 5400 rpm
- p2000 = 3000 rpm

Result:

- Output value of LIM 1: r20239 = 5400 rpm / 3000 rpm = 1.8
- r2063[1] = X1 x X2 = 1.8 x 4000 0000 hex = 7333 3333 hex

1.2 Commissioning

1.2.1 Activation of the "Free blocks" function module

STARTER commissioning software

The activation of the STARTER commissioning software is **only** possible OFFLINE and is performed via the Properties dialog box of the drive objects. The "free blocks" can be selected on the Function modules tab.

To do this, open the appropriate project with STARTER and open the subelements in the project navigator by left-clicking the plus sign.
Right-clicking opens the context menu of the selected drive object. Left-click "Properties" and "Function modules". If necessary, scroll to the "Free blocks". Activate this function module via the check box and confirm with "OK". The Properties dialog box is then closed automatically.

The "Free blocks" check box is not activated per default. If the check box is activated and confirmed with "OK", the "Free blocks" function module is activated after the project download.

AOP30 (Advanced Operator Panel 30)

In the AOP30, the "Free blocks" function module is activated directly in the parameter list via p0108[x] in the "Definition of the drive type (p0009 = 2)" state. The number corresponding to the drive object on which the "free blocks" are to be activated must be selected in index "x".

The available drive objects (DOs) and the associated numbers can be determined using the following steps:

- An index entry with the type of the respective drive object exists in parameter p0107[0...15] (DO type) for each available drive object in the drive line-up.
- The associated number under which the drive object can be addressed is in the corresponding index entry for each drive object in parameter p0101[0...15] (DO numbers).

  This information is required to determine the drive object number for BICO interconnections.

Example:

- p0107[1] = "12: VECTOR"
- In this example, the drive object "VECTOR" can be addressed under the drive object number p0101[1].
- The "Free blocks" function module for the drive object "VECTOR" is activated via p0108[1] = 262144 (= 40000 hex). This means Bit 18 must be set in p0108[index no.].

  The index in p0108 for the drive object "VECTOR" is the same index as in p0107.

  Procedure for activation via AOP30:

  – In the main menu (Taste "Menu") of the AOP30, select the "Parameterization" menu and confirm with "OK". Select "Individual DO" there and confirm with "OK".

  – In the "Parameterize DO selection" menu, select item "1: CU_G" and confirm with "OK".

  – Select parameter p0009 ("Higher"/"Lower" key) and after actuating "Change" set the value 2: ("Higher"/"Lower" key) and confirm with "OK".

  – Then press the key-operated pushbutton (bottom left).

    If the access level has the value "3: Expert" or higher, exit this menu with "Back".

    Otherwise select the access level ("Higher"/"Lower" key) in this menu and confirm with "OK". In the submenu "Access level", select item "3: Expert" and confirm with "OK". The menu "All parameters" is reached after clicking the "Back" key.

  – In the "All parameters" menu, select the parameter p0108 and click "Change". Then select the index of p0108 that is assigned to the desired drive object (index 1 in the example) on which the function module is to be activated and click "Change".

  – In the submenu p0108[xx], select Bit 18: Free blocks, activate by clicking "Change" and confirm with "OK".

  – Switch to the "All parameters" menu for drive object CU_G with "Back". Select p0009 again ("Higher"/"Lower" key) in this menu and click "Change".

  – In the submenu of p0009, select the value "0: Ready" ("Higher"/"Lower" key) and confirm with "OK".

  The control module now performs a warm restart and the AOP30 reloads the parameter description. This takes several minutes.

1.2.2 Activation of the individual function blocks

Each individual function block is assigned to an execution group via two parameters.

The first parameter defines the number of the execution group (0...9), the second parameter specifies the execution sequence within the execution group.

Within an execution group, a function block with a lower value for the execution sequence is computed before a function block with a higher value.

Note

In the factory setting, each function block is assigned to execution group 9999 and therefore the function block is not computed.

It must also be ensured that execution group x is called cyclically. This is performed by setting parameter p20000[x] to a value > 0.

Example:

On a drive object of the "VECTOR" type and a Motor Module of the Chassis frame size, the base sampling time r20002 = 0.25 ms and therefore p20000[0] = 4 is set.

This means:
Execution group 0 (= index of p20000) is called every 1 ms (see example on Page 1-14).

Check via r20001[0] = 1.0 ms

1.2.3 Computation time load

The processing of the free blocks requires computation time. Therefore, when this function module is activated, the maximum number of drive objects on a CU3xx, CX32 (only for operation with SM150) and SM150 can no longer be computed.

The resulting computation time load depends on the following:

- Number of activated execution groups (p20000[x] > 0)
- Number of computed function blocks
- Sampling time

Parameter r9976 (system load) is available in the system as an online tool. The average value of the computation time load in r9976[1] should always be below 85 %. The maximum value of the cyclic computation time load in r9976[5] should also always be below 85 %. If the limit of 92 % for the computation time load is exceeded, alarm A50512 is issued. When the computation time load falls below 88 %, the alarm is reset.

Offline, SIZER can determine approximately whether a configuration on a CU3xx or D4xx can be computed. Whereby the additional computation time load caused by the activation of the "Free blocks" function module is **not** taken into account.

Notice

The computation time load only reaches its maximum value when the following conditions are fulfilled:

- All required function modules are activated.
- All drives and infeeds are switched on.
- The closed-loop control has been enabled on all drives and infeeds.

The values displayed in r9976 have been significantly smoothed internally. Therefore, a change in the computation time load is only displayed fully in r9976 after 2 ... 3 minutes.

If a function block of each type (23 different function blocks) are computed on a drive object with a sampling time Tab = 1 ms, this increases the computation time load by approx. 21 %.

If it is uncertain in an OFFLINE configuration whether the limit value for the computation time load of 85 % (r9976[1] and r9976[5]) can be maintained, p20000[0...9] = 0 should be left first of all on all drive objects.

The following should be performed in the OFFLINE project:

- Activate all required function modules on the drive objects.
- Assign all required function modules to their execution groups.
- Establish all connections between the function blocks and, if appropriate, to the drive objects.

After the project download, the free blocks do not cause any additional computation time load, as no execution group is called cyclically.

r9976[1] and r9976[5] should be read out in this state.

In ONLINE mode, the execution groups can now be activated in succession by parameterizing the required value in p20000[x] for each drive object. The computation time load can be checked in r9976. The drive and infeed controls can then be switched on and enabled individually in succession.

When the closed-loop controls of all drive objects, all required function modules and all execution groups are in operation, the limit value of 85 % for the computation time load should be checked in r9976[1] and r9976[5].

1.3 Description of the function blocks

1.3.1 AND

Brief description

AND function block of the BOOL type with four inputs.

Mode of operation

This function block links the binary values on the inputs I to a logical AND and gives the result to its binary output Q.

$$Q = I_0 \wedge I_1 \wedge I_2 \wedge I_3$$

Output Q = 1 when the value 1 is present at all inputs I0 to I3. In all other cases, output Q = 0.

1.3.2 OR

Brief description

OR function block of the BOOL type with four inputs.

Mode of operation

This function block links the binary variables on the inputs I to a logic OR (disjunction) and gives the result to its binary output Q.

$$Q = I_0 \vee I_1 \vee I_2 \vee I_3$$

Output Q = 0 when the value 0 is present at all inputs I0 to I3. In all other cases, output Q = 1.

1.3.3 XOR (Exclusive OR)

Brief description

XOR function block of the BOOL type with four inputs.

Mode of operation

This function block links the binary variables on the inputs I according to the Exclusive OR logic function and gives the result to its binary output Q.

Output Q = 0 when a 0 is present on all inputs I0 to I3 or when a 1 is present on an even number of inputs I0 to I3.

Output Q = 1 when a 1 is present on an odd number of inputs I0 to I3.

1.3.4 NOT (Inverter)

Brief description

Inverter of the BOOL type.

Mode of operation

This function block inverts the binary variables at input I and gives the result to output Q.

$$Q = \bar{I}$$

Output Q = 1 when the value 0 is present on input I.

Output Q = 0 when the value 1 is present on input I.

1.3.5 ADD (Adder)

Brief description

Adder of the REAL type with four inputs.

Mode of operation

This function block adds the values entered at the X inputs taking the sign into account.

The result is limited to a range of -3.4E38 to 3.4E38 and is output at output Y.

$$Y = X_0 + X_1 + X_2 + X_3$$

1.3.6 SUB (Subtracter)

Brief description

Subtracter of the REAL type with two inputs.

Mode of operation

This function block subtracts the value entered at input X1 from the value entered at input X0 taking the sign into account.

The result is limited to a range of -3.4E38 to 3.4E38 and is output at output Y.

$$Y = X_0 - X_1$$

1.3.7 MUL (Multiplier)

Brief description

Multiplier of the REAL type with four inputs.

Mode of operation

This function block multiplies the values entered at the X inputs taking the sign into account.

The result is limited to a range of -3.4E38 to +3.4E38 and is output at output Y.

$$Y = X_0 \cdot X_1 \cdot X_2 \cdot X_3$$

1.3.8 DIV (Divider)

Brief description

Divider of the REAL type with two inputs.

Mode of operation

This function block divides the value entered at input X0 by the value entered at input X1.

The result is output at the outputs as follows:

- Y output: Quotient with places before and after the decimal point
- YIN output: Integer quotient
- MOD output: Division rest (absolute residual value)

The Y output is limited to a range of approximately -3.4E38 to +3.4E38.

$$Y = \frac{X_0}{X_1}$$

If output value Y exceeds the permissible range of approximately -3.4E38 to +3.4E38 (because divisor X1 is very small or zero), then the limit value of the output range with the correct sign is output at output Y. The binary output QF = 1 is set at the same time.

With division of 0/0, the block output Y remains unchanged. The binary output QF is set to 1.

1.3.9 AVA (Absolute value generator with sign evaluation)

Brief description

Arithmetic function block of the REAL type for the absolute value generation.

Mode of operation

This function block generates the absolute value of the value present at input X. The result is output at output Y.

$$Y = |X|$$

If the input variable is negative, binary output SN = 1 is set at the same time.

1.3.10 MFP (Pulse generator)

Brief description

- Timer for generating a pulse with a fixed duration.
- Used as a pulse-contracting or pulse-stretching monoflop.

Mode of operation

The rising edge of a pulse at input I sets output Q to 1 for the pulse duration T. The pulse generator cannot be retriggered.

Time flowchart

Output pulse Q depending on pulse duration T and input pulse I.

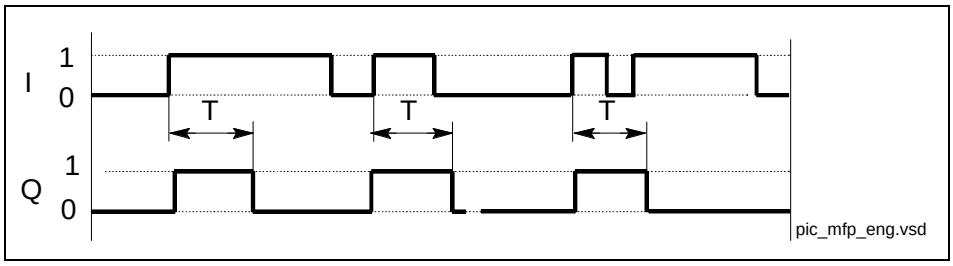

Fig. 1-5 MFP (pulse generator): Time flowchart

1.3.11 PCL (Pulse contractor)

Brief description

Timer for limiting the pulse duration.

Mode of operation

The rising edge of a pulse at input I sets output Q to 1.

Output Q becomes 0 when input I = 0 and the pulse duration T has expired.

Time flowchart

Output pulse Q depending on pulse duration T and input pulse I.

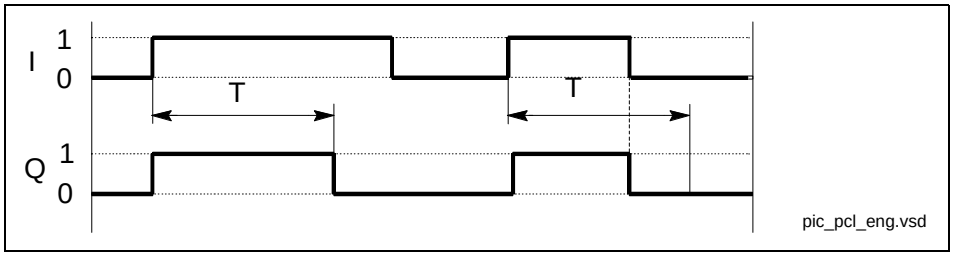

Fig. 1-6 PCL (pulse contractor): Time flowchart

1.3.12 PDE (ON delay)

Brief description

Timer with ON delay of the BOOL type.

Mode of operation

The rising edge of a pulse at input I sets output Q to 1 after the pulse delay time T.

Output Q becomes 0 when I = 0.

If the duration of input pulse I is less than pulse delay time T, then Q remains at 0.

If time T is so large that the maximum value that can be represented internally (T/ta as 32-bit value, with ta = sampling time) is exceeded, the maximum value is applied as a limitation (e.g. for ta = 1 ms, approx. 50 days).

Time flowchart

Output pulse Q depending on pulse duration T and input pulse I.

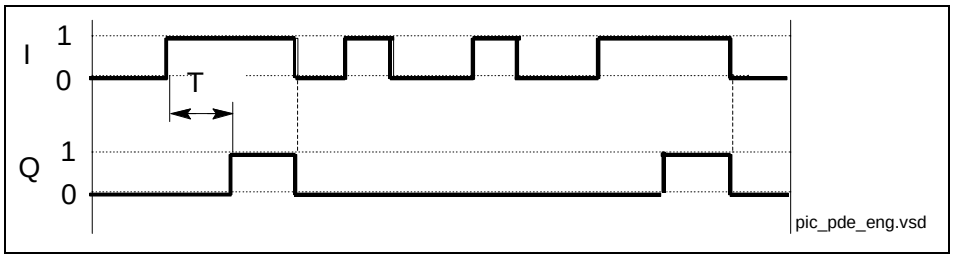

Fig. 1-7 PDE (ON delay): Time flowchart

1.3.13 PDF (OFF delay)

Brief description

Timer with OFF delay.

Mode of operation

The falling edge of a pulse at input I resets output Q to 0 after the OFF delay time T.

Output Q becomes 1 when I = 1.

Output Q becomes 0 when input pulse I = 0 and the OFF delay time T has expired.

If input I is reset to 1 before time T expires, then output Q remains at 1.

Time flowchart

Output pulse Q depending on pulse duration T and input pulse I.

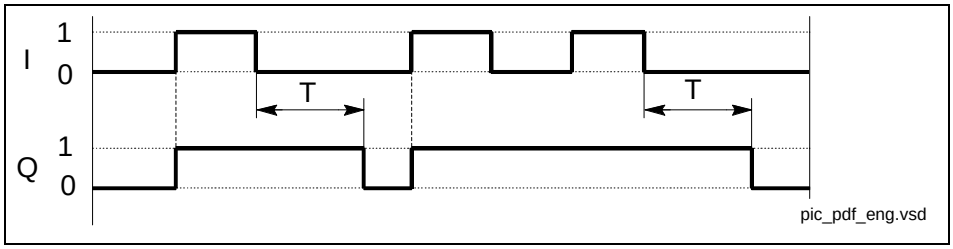

Fig. 1-8 PDF (OFF delay): Time flowchart

1.3.14 PST (Pulse stretcher)

Brief description

Timer for generating a pulse with a minimum duration and with additional reset input.

Mode of operation

The rising edge of a pulse at input I sets output Q to 1.

Output Q does not reset to 1 until input pulse I = 0 and the pulse duration T has expired.

Output Q can be set to zero at any time by means of the reset input R with R = 1.

Time flowchart

Output pulse Q depending on pulse duration T and input pulse I (with R = 0).

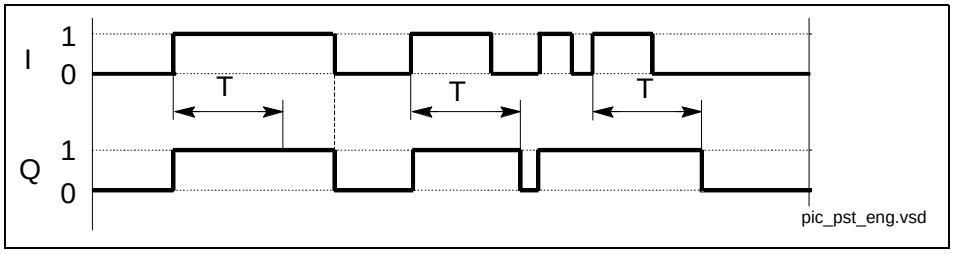

Fig. 1-9 PST (pulse stretcher): Time flowchart

1.3.15 RSR (RS flip-flop, reset dominant)

Brief description

Reset dominant RS flip-flop for use as static binary value memory.

Mode of operation

With logic 1 at input S, output Q is set to logic 1.

If input R is set to logic 1, then output Q is set to logic 0.

If both inputs are logic 0, then Q does not change.

However, if both inputs are logic 1, then Q is logic 0 as the reset input dominates.

Output QN always has the value inverse to Q.

1.3.16 DFR (D flip-flop, reset dominant)

Brief description

Function block of the BOOL type for use as D flip-flop with reset dominance.

Mode of operation

If the two inputs S and R are logic 0, the D receive information is switched through to output Q on a rising edge at trigger input I.

Output QN always has the value inverse to Q. With logic 1 at input S, output Q is set to logic 1.

If input R is set to logic 1, then output Q is set to logic 0. If both inputs are logic 0, then Q does not change.

However, if the two inputs S and R are logic 1, then Q is logic 0 as the reset input dominates.

Time flowchart

Output pulse Q depending on the D input and input pulse I for S = R = 0.

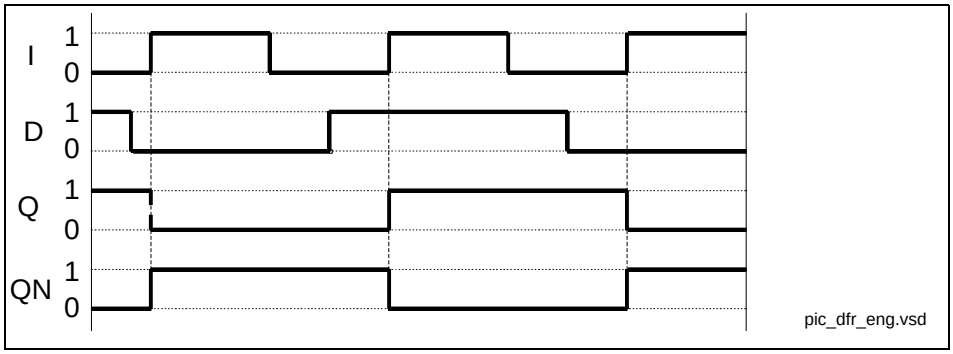

Fig. 1-10 DFR (D flip-flop, reset dominant): Time flowchart

1.3.17 BSW (Binary switch)

Brief description

This function block switches one of two binary input variables (BOOL type) to the output.

Mode of operation

If input I = 0, then I1 is switched to output Q.

If input I = 1, then I2 is switched to output Q.

1.3.18 NSW (Numeric switch)

Brief description

This function block switches one of two numeric input variables (REAL type) to the output.

Mode of operation

If input I = 0, then X1 is switched to output Y.

If input I = 1, then X2 is switched to output Y.

1.3.19 LIM (Limiter)

Brief description

- Function block for limiting.
- Adjustable upper and lower limit.
- Indication when set limits are reached.

Mode of operation

This function block transfers the input variable X to its output Y, whereby the input variable is limited depending on LU and LL.

If the input variable reaches the upper limit LU, then output QU = 1 is set.

If the input variable reaches the lower limit LL, then output QL = 1 is set.

If the lower limit is greater than or equal to the upper limit, then output Y is set to the upper limit LU.

Algorithm:

$$Y = \begin{cases} LU & \text{for } X \geq LU \\ X & \text{for } LL < X < LU \\ LL & \text{for } X \leq LL \end{cases}$$

Supplementary condition: LL < LU

1.3.20 PT1 (Smoothing element)

Brief description

- First-order delay element with setting function.
- Used as smoothing element.

Mode of operation

Setting function not active (S = 0)

Input variable X, dynamically delayed by smoothing time constant T, is switched to output Y.

T determines the steepness of the rise of the output variable. It specifies the time at which the transfer function has risen to 63 % of its full-scale value.

After t = 3T, the transfer function reaches approximately 95 % of its full-scale value.

The internally fixed proportional gain is 1 and cannot be changed.

If T/TA is sufficiently large (T/TA > 10), the transfer function the following characteristic:

$$Y(t) = X \cdot (1 - e^{-t/T})$$

Supplementary condition: t = n * TA

Discrete values are calculated according to the following algorithm:

$$Y_n = Y_{n-1} + \frac{TA}{T} \cdot (X_n - Y_{n-1})$$

Yn	Value of Y in the sampling interval n
Yn-1	Value of Y in the sampling interval n-1
Xn	Value of X in the sampling interval n

Setting function active (S = 1)

When the setting function is active, the current setting value SVn is accepted at the output variable:

Yn = SVn

Note

The larger T/TA is, the smaller is the amplitude change on Y from one sampling instant to the next. TA is the configured sampling time of the function block.

T is limited internally: T >= TA

1.3.21 INT (Integrator)

Brief description

- Function block with integral action.
- Integrator functions:
  - Set initial value
  - Adjustable integral time constant
  - Adjustable limits
  - For normal integrator operation, a positive limit value must be specified for LU and a negative limit value for LL.

Mode of operation

The change in output variable Y is proportional to input variable X and inversely proportional to the integral time constant TI.

Output Y of the integrator can be limited via the inputs LU and LL. If the output reaches one of the two limits, a message is sent via the outputs QU or QL. If LL >= LU, then output Y = LU.

The calculation of the discrete values (TA is the configured sampling time of the function block) is performed according to the following algorithm:

$$Y_n = Y_{n-1} + \frac{TA}{TI} \cdot X_n$$

Yn	Value of Y in the sampling interval n
Yn-1	Value of Y in the sampling interval n-1
Xn	Value of X in the sampling interval n

When S = 1, the output variable Y is set to the setting value SV. Two functions can be implemented via S:

- Track integrator (Y = SV)

  The binary input is S = 1 and the setting value SV is changed. If applicable, the output jumps to the setting value immediately after the setting operation.

- Set integrator to initial value SV

  S is switched to 1. S is then set to 0 and the integrator starts from SV in the direction specified by the polarity of input variable X.

Note

TI is limited internally: TI >= TA

1.3.22 DIF (Derivative-action element)

Brief description

Function block with derivative-action behavior.

Mode of operation

Output variable Y is proportional to the rate of change of input variable X, multiplied by the derivative-action time constant TD.

Discrete values are calculated according to the following algorithm:

$$Y_n = (X_n - X_{n-1}) \cdot \frac{TD}{TA}$$

Yn	Value of Y in the sampling interval n
Yn-1	Value of Y in the sampling interval n-1
Xn	Value of X in the sampling interval n

Note

The larger TD/TA is, the greater is the amplitude change on Y from one sampling instant to the next. TA is the configured sampling time of the function block.

TD is limited internally to TD >= 0.

Caution: Overload is possible!

1.3.23 LVM (Double-sided limit monitor with hysteresis)

Brief description

- This function block of the BOOL type monitors an input variable by comparing it with selectable reference variables.
- Use:
  - Monitoring of setpoints, actual and measured values.
  - Suppression of frequent switching (jitter).
- This function block provides a window discriminator function.

Mode of operation

Using a transfer characteristic (see transfer characteristic) with hysteresis, this function block calculates an internal intermediate value.

This intermediate value is compared with the interval limits, and the result is output at outputs QU, QM, and QL.

The transfer characteristic is configured with the values for the mean value M, the interval limit L, and the hysteresis HY.

Transfer characteristic

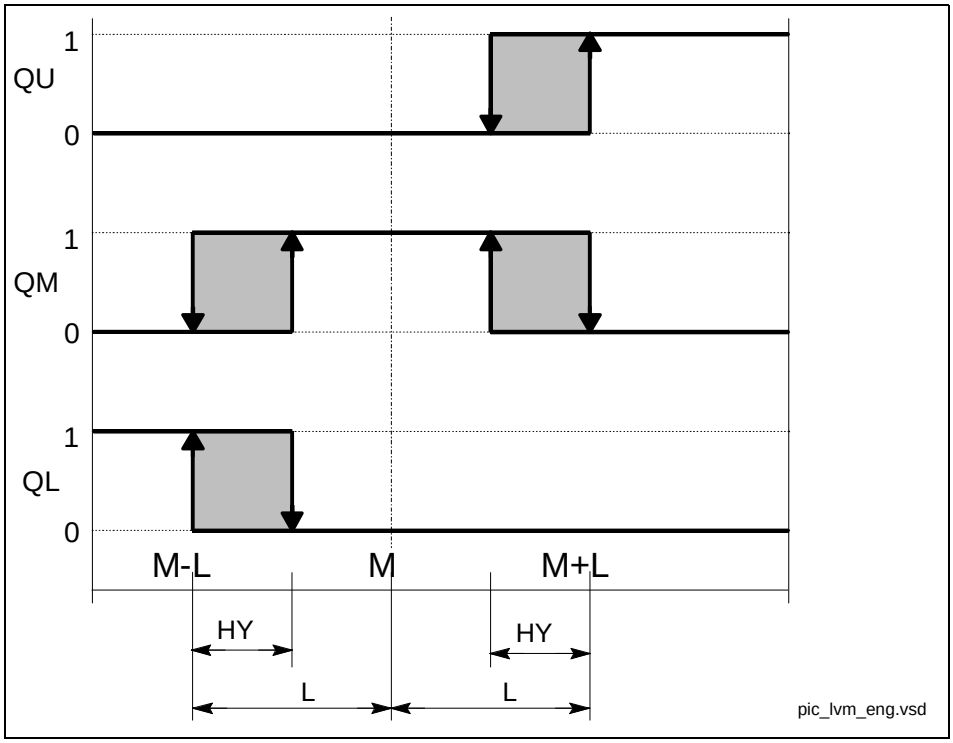

Fig. 1-11 LVM (double-sided limit monitor with hysteresis): Transfer characteristic

Parameters 2

Content

2.1 Overview of parameters

2.1.1 Explanation of list of parameters

Basic structure of parameter descriptions

The data in the following example has been chosen at random. The table below shows all the information which can be included in the description of a parameter. Some of the information is optional.

The structure of the parameter list (see Section 2.2) is as follows:

- Start of example- -

pxxxx[0...n]	**BICO: Full parameter name / Short name**			
Drive object (function module)	**Changeable:** C1(x), C2(x), U, T			**Access level:** 2
	Data type: Integer16	**Dynamic index:** CDS, p0170		**Function diagram:** 2080
	P group: Closed-loop control	**Unit group:** 7_1		**Unit selection:** p0505
	Min	**Max**		**Factory setting**
	0.00 [Nm]	10.00 [Nm]		2.00 [Nm]
Description:	Text			
Values:	0: Name and meaning of value 0 1: Name and meaning of value 1 2: Name and meaning of value 2 etc.			
Recommendation:	Text			
Index:	[0] = Name and meaning of index 0 [1] = Name and meaning of index 1 [2] = Name and meaning of index 2 etc.			

Bit array:	**Bit**	**Signal name**	**1 signal**	**0 signal**	**FP**
	00	Name and meaning of bit 0	Yes	No	8010
	01	Name and meaning of bit 1	Yes	No	-
	02	Name and meaning of bit 2	Yes	No	8012
		etc.			

Dependency:	Text See also: pxxxx, rxxxx See also: Fxxxxx, Axxxxx
Danger!	Corresponds to safety notice "Danger with warning triangle".
Warning!	Corresponds to safety notice "Warning with warning triangle".
Caution!	Corresponds to safety notice "Caution with warning triangle".
Caution:	Corresponds to safety notice "Caution without warning triangle".
Notice:	Corresponds to safety notice "Notice without warning triangle".
Note:	Information which might be useful.

- End of example- -

pxxxx[0...n] Parameter number

The parameter number consists of a "p" or "r", followed by the parameter number and the index (optional).

Examples of the representation in the parameter list:

- p... Adjustable parameter (read and write parameter)
- r... Display parameter (read-only)
- p0918 Adjustable parameter 918
- p0099[0...3] Adjustable parameter 99, indices 0 to 3
- p1001[0...n] Adjustable parameter 1001, indices 0 to n (n = configurable)
- r0944 Display parameter 944

Other examples of notation in the documentation:

- p1070[1] Adjustable parameter 1070, index 1
- p2098[1].3 Adjustable parameter 2098, index 1 bit 3
- r0945[2](3) Display parameter 945, index 2 of drive object 3
- p0795.4 Adjustable parameter 795, bit 4

The following applies to adjustable parameters:

The "shipped" parameter value is specified under "Factory setting" with the relevant unit in square parenthesis. The value can be adjusted within the range defined by "Min" and "Max".

The term "linked parameterization" is used in cases where changes to adjustable parameters affect the settings of other parameters.

Linked parameterization can occur, for example, as a result of the following actions or parameters:

- Execute macros

  p0015, p0700, p1000, p1500
- Set PROFIBUS message frame (BICO interconnection)

  p0922
- Set component lists

  p0230, p0300, p0301, p0400
- Calculate and preset automatically

  p0112, p0340, p0578, p3900
- Restore factory settings

  p0970

The following applies to display parameters:

The fields "Min", "Max" and "Factory setting" are specified with a dash "-" and the relevant unit in square parenthesis.

BICO: Full parameter name / Short name

Some parameters have the following abbreviations in front of their name:

- BI: Binector input
  This parameter is used for selecting the source of a digital signal.
- BO: Binector output
  This parameter is available as a digital signal for interconnection with other parameters.
- CI: Connector input
  This parameter is used for selecting the source of an "analog" signal.
- CO: Connector output
  This parameter is available as an "analog" signal for interconnection with other parameters.
- CO/BO: Connector/binector output
  This parameter is available as an "analog" and also as a digital signal for interconnection with other parameters.

Drive object (function module)

A drive object (DO) is an independent, "self-contained" functional unit which possesses its own parameters and, in some cases, faults and alarms.

When carrying out commissioning using the commissioning software, you can select/deselect additional functions and their parameters by activating/deactivating Function Modules accordingly.

The parameter list specifies the associated drive object and Function Module for each individual parameter.

A parameter can belong to either one, several, or all drive objects.

The following information relating to "Drive object" and "Function Module" can be displayed under the parameter number:

Table 2-1 Data in "Drive object (function module)" field

Drive object (function module)	Meaning
FBL-Object (FBL)	Drive object type that can be activated with the "Free blocks" function module (FBL) (see Section 1.1.1).

Changeable

The "-" sign indicates that the parameter can be changed in any state and that the change takes effect immediately.

The specifications "C1(x), C2(x), T, U" ((x): optional) mean that the parameter can only be changed in this drive unit state and that the change will not take effect until the state is changed. One or more states are possible.

The following states are available:

- C1(x) Device commissioning C1: **C**ommissioning **1**

  Device commissioning is in progress (p0009 > 0).

  Pulses cannot be enabled.

  The parameter can only be changed in the following device commissioning settings (p0009 > 0):

  - C1: Changeable for all settings p0009 > 0.
  - C1(x): Only changeable when p0009 = x.

  A modified parameter value does not take effect until device commissioning is exited with p0009 = 0.

- C2(x) Drive object commissioning C2: **C**ommissioning **2**

  Drive commissioning is in progress (p0009 = 0 and p0010 > 0).

  Pulses cannot be enabled.

  The parameter can only be changed in the following drive commissioning settings (p0010 > 0):

  - C2: Changeable for all settings p0010 > 0.
  - C2(x): Only changeable when p0010 = x.

  A modified parameter value does not take effect until drive commissioning is exited with p0010 = 0.

- U Operation U: R**u**n

  Pulses are enabled.

- T Ready for operation T: Ready **t**o run

  The pulses are not enabled and status "C1(x)" or "C2(x)" is not active.

Note:

Parameter p0009 is CU-specific (available on Control Unit).

Parameter p0010 is drive-specific (available for each drive object).

The operating status of individual drive objects is displayed in r0002.

Access level (refers only to access via BOP (Basic Operator Panel))

Specifies the access level required to be able to display and change this parameter. The required access level can be set via p0003.

The following access levels are available:

1. Standard
2. Extended
3. Expert
4. Service
5. Macro (the parameter can only be changed via macro)

Note:

Parameter p0003 is CU-specific (available on Control Unit).

Data type

The following data types are available for the parameter values:

• I8	Integer8	8-bit integer
• I16	Integer16	16-bit integer
• I32	Integer32	32-bit integer
• U8	Unsigned8	8-bit without sign
• U16	Unsigned16	16-bit without sign
• U32	Unsigned32	32-bit without sign
• Float	FloatingPoint32	32-bit floating-point number

Dynamic index

This information is not relevant for the "Free blocks" function.

Data sets are not supported with the "Free blocks" function.

Function diagram

The parameter is included in this function diagram. The structure of the parameter function and its interrelationship with other parameters is shown in the diagram.

Example:

Function diagram: 3060.3	3060:	Function diagram number
	3:	Signal path (optional)

P group (refers only to access via BOP (Basic Operator Panel))

Specifies the functional group to which the parameter belongs. The required parameter group can be set via p0004.

Note:

Parameter p0004 is CU-specific (available on Control Unit).

Unit, unit group and unit selection

This information is not relevant for the "Free blocks" function.

Unit group and unit selection are not supported with the "Free blocks" function.

Parameter values

Min	Minimum value of the parameter [unit]
Max	Maximum value of the parameter [unit]
Factory setting	As delivered value (default) [unit] A different value may be displayed for certain parameters (e.g. p1800) at the initial commissioning stage. Reason: The setting of these parameters is determined by the operating environment of the Control Unit (e.g. depending on device type, macro, power unit).

Note:

For SINAMICS G150/G130/S150, the macros and their settings are provided in the following documentation:

References: /BAx/ x = 1, 2, 3
SINAMICS G150/G130/S150 Operating Instructions

Description

Explanation of the function of a parameter.

Values

Lists the possible values of a parameter.

Recommendation

Information about recommended settings.

Index

The name and meaning of each individual index is specified for indexed parameters.

The following applies for the values (min, max, factory setting) of indexed adjustable parameters:

- Min, Max:

  The setting range and unit apply to all indices.

- Factory setting:

  When all indices have the same factory setting, index 0 is specified with unit to represent all indices.

  When the indices have different factory settings, they are all listed individually with unit.

Bit array

For parameters with bit arrays, the following information is provided about each bit:

- Bit number and signal name
- Meaning with signal states 0 and 1
- Function diagram (optional)

  The signal is shown on this function diagram.

Dependency

Conditions which need to be fulfilled in connection with this parameter. Also includes special effects which can occur between this parameter and others.

See also: List of other relevant parameters.

Safety-related guidelines

Important information which must be observed to avoid the risk of physical injury or property damage.

Information which must be observed to avoid problems.

Information which the user or operator may find useful.

Danger! corresponds to  Danger

Warning! corresponds to  Warning

Caution!	corresponds to		Caution
Caution:	corresponds to		Caution
Notice:	corresponds to		Notice

Note:

A description of individual safety notices can be found in the appendix to this manual (see **Safety guidelines**).

2.2 List of parameters

Product: SINAMICS OA Freeblocks, Version: 2402300, Label: , Language: eng

p20000[0...9] Run-time group property / RTG property

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** -
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9003	0

Description: Allocates properties to run-time groups 0 to 9. This property comprises the sampling time and for p20000[x] = 9003, the instant of the call within the sampling time. Index x of p20000 corresponds to the number of the run-time group: p20000[0] is used to set the property of the run-time group 0, ... , p20000[9] is used to set the property of run-time group 9.

p20000[x] = 0 Run-time group is not calculated.
p20000[x] = 1 Free run-time group T_sample = 1 * r20002 1)
p20000[x] = 2 Free run-time group T_sample = 2 * r20002 1)
p20000[x] = 3 Free run-time group T_sample = 3 * r20002 1)
p20000[x] = 4 Free run-time group T_sample = 4 * r20002 1)
...
p20000[x] = 255 Free run-time group T_sample = 255 * r20002 1)
p20000[x] = 256 Free run-time group T_sample = 256 * r20002 1)
p20000[x] = 1002 Free run-time group T_sample = 2 * r20003
p20000[x] = 1003 Free run-time group T_sample = 3 * r20003
p20000[x] = 1004 Free run-time group T_sample = 4 * r20003
p20000[x] = 1005 Free run-time group T_sample = 5 * r20003
p20000[x] = 1006 Free run-time group T_sample = 6 * r20003
p20000[x] = 1008 Free run-time group T_sample = 8 * r20003
p20000[x] = 1010 Free run-time group T_sample = 10 * r20003
p20000[x] = 1012 Free run-time group T_sample = 12 * r20003
p20000[x] = 1016 Free run-time group T_sample = 16 * r20003
p20000[x] = 1020 Free run-time group T_sample = 20 * r20003
p20000[x] = 1024 Free run-time group T_sample = 24 * r20003
p20000[x] = 1032 Free run-time group T_sample = 32 * r20003
p20000[x] = 1040 Free run-time group T_sample = 40 * r20003
p20000[x] = 1048 Free run-time group T_sample = 48 * r20003
p20000[x] = 1064 Free run-time group T_sample = 64 * r20003
p20000[x] = 1096 Free run-time group T_sample = 96 * r20003
p20000[x] = 9003 Fixed run-time group "before setpoint channel" (only vector, servo) 2)

1) This selection value can only be selected if, for sampling time T_sample of this run-time group, the following applies: 1 ms <= T_sample <= r20003.

2) The log-on of the fixed run-time groups p20000[x] = 9003 is realized with the sampling time of the setpoint channel, however, as a minimum with a sampling time of 1 ms. If, as a result of this limit, the actual sampling time deviates from the sampling time of the setpoint channel p0115[3], then Alarm A20103 is output. Another run-time group with a sampling time >= 1 ms should be selected. "Before setpoint channel" means, before calculating function charts 3010, 3020, 3030, 3040 and following, if the setpoint channel is activated (bit 8 of p0108 == p0108.8 = 1) . If, e.g. for SERVO, a setpoint channel has not been configured (p0108.8 = 0), then the calculation is made before function chart 3095.

Values:

0: Do not calculate
1: Sampling time 1 * r20002
2: Sampling time 2 * r20002
3: Sampling time 3 * r20002
4: Sampling time 4 * r20002
5: Sampling time 5 * r20002
6: Sampling time 6 * r20002
7: Sampling time 7 * r20002
8: Sampling time 8 * r20002
9: Sampling time 9 * r20002
10: Sampling time 10 * r20002
11: Sampling time 11 * r20002
12: Sampling time 12 * r20002
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14: Sampling time 14 * r20002
15: Sampling time 15 * r20002
16: Sampling time 16 * r20002
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256: Sampling time 256 * r20002
1002: Sampling time 2 * r20003
1003: Sampling time 3 * r20003
1004: Sampling time 4 * r20003
1005: Sampling time 5 * r20003
1006: Sampling time 6 * r20003
1008: Sampling time 8 * r20003
1010: Sampling time 10 * r20003
1012: Sampling time 12 * r20003
1016: Sampling time 16 * r20003
1020: Sampling time 20 * r20003
1024: Sampling time 24 * r20003
1032: Sampling time 32 * r20003
1040: Sampling time 40 * r20003
1048: Sampling time 48 * r20003
1064: Sampling time 64 * r20003
1080: Sampling time 80 * r20002
1096: Sampling time 96 * r20003
9003: Calculate before the setpoint channel

Index: [0] = Run-time group 0
[1] = Run-time group 1
[2] = Run-time group 2
[3] = Run-time group 3
[4] = Run-time group 4
[5] = Run-time group 5
[6] = Run-time group 6
[7] = Run-time group 7
[8] = Run-time group 8
[9] = Run-time group 9

r20001[0...9] Run-time group sampling time / RTG sampling time

FBL-Object (FBL)

Can be changed: - **Access level:** 1
Data type: Floating Point **Dynamic index:** - **Function diagram:** -
P-Group: - **Units group:** - **Unit selection:** -

Min	Max	Factory setting
- [ms]	- [ms]	- [ms]

Description: Displays the actual sampling time of the run-time group 0 to 0.

Index: [0] = Run-time group 0
[1] = Run-time group 1
[2] = Run-time group 2
[3] = Run-time group 3
[4] = Run-time group 4
[5] = Run-time group 5
[6] = Run-time group 6
[7] = Run-time group 7
[8] = Run-time group 8
[9] = Run-time group 9

r20002 Basis sampling time, hardware / Basis samp time HW

FBL-Object (FBL)

Can be changed: - **Access level:** 1
Data type: Floating Point **Dynamic index:** - **Function diagram:** -
P-Group: - **Units group:** - **Unit selection:** -

Min	Max	Factory setting
- [ms]	- [ms]	- [ms]

Description: Displays the lowest sampling time effective at this drive object for values 1 to 256 of p20000.
T_sample = p20000 * r20002

r20003 Basis sampling time, software / Basis samp time SW

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Floating Point
Dynamic index: -
Function diagram: -
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
- [ms]	- [ms]	- [ms]

Description: Displays the sampling time as factor effective at this drive object for values from 1002 to 1096 of p20000.
T_sample = (p20000 - 1000) * r20003

p20030[0...3] BI: AND 0 inputs / AND 0 inputs

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7210
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance AND 0 of the AND function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20031 BO: AND 0 output Q / AND 0 output Q

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7210
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q = I0 & I1 & I2 & I3 of instance AND 0 of the AND function block.

p20032 AND 0 RTG / AND 0 RTG

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Integer16
Dynamic index: -
Function diagram: 7210
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance AND 0 of the AND function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20033 AND 0 run sequence / AND 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	10

Description: Setting parameter for the run sequence of instance AND 0 within the run-time group set in p20032.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20034[0...3] BI: AND 1 inputs / AND 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance AND 1 of the AND function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20035 BO: AND 1 output Q / AND 1 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q = I0 & I1 & I2 & I3 of instance AND 1 of the AND function block.

p20036 AND 1 RTG / AND 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance AND 1 of the AND function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20037 AND 1 run sequence / AND 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	20

Description: Setting parameter for the run sequence of instance AND 1 within the run-time group set in p20036.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20038[0...3] BI: AND 2 inputs / AND 2 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance AND 2 of the AND function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20039 BO: AND 2 output Q / AND 2 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q = I0 & I1 & I2 & I3 of instance AND 2 of the AND function block.

p20040 AND 2 RTG / AND 2 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance AND 2 of the AND function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20041 AND 2 run sequence / AND 2 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 2710
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	30

Description: Setting parameter for the run sequence of instance AND 2 within the run-time group set in p20040.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20042[0...3] BI: AND 3 inputs / AND 3 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance AND 3 of the AND function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20043 BO: AND 3 output Q / AND 3 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q = I0 & I1 & I2 & I3 of instance AND 3 of the AND function block.

p20044 AND 3 RTG / AND 3 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance AND 3 of the AND function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20045 AND 3 run sequence / AND 3 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7210
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	40

Description: Setting parameter for the run sequence of instance AND 3 within the run-time group set in p20044.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20046[0...3] BI: OR 0 inputs / OR 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance OR 0 of the OR function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20047 BO: OR 0 output Q / OR 0 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q = I0 | I1 | I2 | I3 of instance OR 0 of the OR function block.

p20048 OR 0 RTG / OR 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance OR 0 of the OR function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20049 OR 0 run sequence / OR 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	60

Description: Setting parameter for the run sequence of instance OR 0 within the run-time group set in p20048.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20050[0...3] BI: OR 1 inputs / OR 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance OR 1 of the OR function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20051 BO: OR 1 output Q / OR 1 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q = I0 | I1 | I2 | I3 of instance OR 1 of the OR function block.

p20052 OR 1 RTG / OR 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance OR 1 of the OR function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20053 OR 1 run sequence / OR 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	70

Description: Setting parameter for the run sequence of instance OR 1 within the run-time group set in p20052.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20054[0...3] BI: OR 2 inputs / OR 2 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance OR 2 of the OR function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20055 BO: OR 2 output Q / OR 2 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q = I0 | I1 | I2 | I3 of instance OR 2 of the OR function block.

p20056 OR 2 RTG / OR 2 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance OR 2 of the OR function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20057 OR 2 run sequence / OR 2 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	80

Description: Setting parameter for the run sequence of instance OR 2 within the run-time group set in p20056.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20058[0...3] BI: OR 3 inputs / OR 3 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance OR 3 of the OR function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20059 BO: OR 3 output Q / OR 3 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q = I0 | I1 | I2 | I3 of instance OR 3 of the OR function block.

p20060 OR 3 RTG / OR 3 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance OR 3 of the OR function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20061 OR 3 run sequence / OR 3 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7212
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	90

Description: Setting parameter for the run sequence of instance OR 3 within the run-time group set in p20060.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20062[0...3] BI: XOR 0 inputs / XOR 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance XOR 0 of the XOR function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20063 BO: XOR 0 output Q / XOR 0 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q of instance XOR 0 of the XOR function block.

p20064 XOR 0 RTG / XOR 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance XOR 0 of the XOR function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20065 XOR 0 run sequence / XOR 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	110

Description: Setting parameter for the run sequence of instance XOR 0 within the run-time group set in p20064.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20066[0...3] BI: XOR 1 inputs / XOR 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance XOR 1 of the XOR function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20067 BO: XOR 1 output Q / XOR 1 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q of instance XOR 1 of the XOR function block.

p20068 XOR 1 RTG / XOR 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance XOR 1 of the XOR function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20069 XOR 1 run sequence / XOR 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	120

Description: Setting parameter for the run sequence of instance XOR 1 within the run-time group set in p20068.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20070[0...3] BI: XOR 2 inputs / XOR 2 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance XOR 2 of the XOR function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20071 BO: XOR 2 output Q / XOR 2 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q of instance XOR 2 of the XOR function block.

p20072 XOR 2 RTG / XOR 2 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance XOR 2 of the XOR function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20073 XOR 2 run sequence / XOR 2 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	130

Description: Setting parameter for the run sequence of instance XOR 2 within the run-time group set in p20072.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20074[0...3] BI: XOR 3 inputs / XOR 3 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0, I1, I2, I3 of instance XOR 3 of the XOR function block.
Index: [0] = Input I0
[1] = Input I1
[2] = Input I2
[3] = Input I3

r20075 BO: XOR 3 output Q / XOR 3 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for binary quantity Q of instance XOR 3 of the XOR function block.

p20076 XOR 3 RTG / XOR 3 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance XOR 3 of the XOR function block should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20077 XOR 3 run sequence / XOR 3 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7214
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	140

Description: Setting parameter for the run sequence of instance XOR 3 within the run-time group set in p20076.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20078 BI: NOT 0 input I / NOT 0 input I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity I of instance NOT 0 of the inverter.

r20079 BO: NOT 0 inverted output / NOT 0 inv output

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the inverted output of instance NOT 0 of the inverter.

p20080 NOT 0 RTG / NOT 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance NOT 0 of the inverter should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20081 NOT 0 run sequence / NOT 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	160

Description: Setting parameter for the run sequence of instance NOT 0 within the run-time group set in p20080.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20082 BI: NOT 1 input I / NOT 1 input I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity I of instance NOT 1 of the inverter.

r20083 BO: NOT 1 inverted output / NOT 1 inv output

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the inverted output of instance NOT 1 of the inverter.

p20084 NOT 1 RTG / NOT 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance NOT 1 of the inverter should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20085 NOT 1 run sequence / NOT 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	170

Description: Setting parameter for the run sequence of instance NOT 1 within the run-time group set in p20084.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20086 BI: NOT 2 input I / NOT 2 input I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity I of instance NOT 2 of the inverter.

r20087 BO: NOT 2 inverted output / NOT 2 inv output

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the inverted output of instance NOT 2 of the inverter.

p20088 NOT 2 RTG / NOT 2 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance NOT 2 of the inverter should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20089 NOT 2 run sequence / NOT 2 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	180

Description: Setting parameter for the run sequence of instance NOT 2 within the run-time group set in p20088.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20090 BI: NOT 3 input I / NOT 3 input I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity I of instance NOT 3 of the inverter.

r20091 BO: NOT 3 inverted output / NOT 3 inv output

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the inverted output of instance NOT 3 of the inverter.

p20092 NOT 3 RTG / NOT 3 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance NOT 3 of the inverter should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20093 NOT 3 run sequence / NOT 3 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7216
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	190

Description: Setting parameter for the run sequence of instance NOT 3 within the run-time group set in p20092.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20094[0...3] CI: ADD 0 inputs / ADD 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities X0, X1, X2, X3 of instance ADD 0 of the adder.
Index: [0] = Input X0
[1] = Input X1
[2] = Input X2
[3] = Input X3

r20095 CO: ADD 0 output Y / ADD 0 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the output quantity Y = X0 + X1 + X2 + X3 of instance ADD 0 of the adder.

p20096 ADD 0 RTG / ADD 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance ADD 0 of the adder should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20097 ADD 0 run sequence / ADD 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	210

Description: Setting parameter for the run sequence of instance ADD 0 within the run-time group set in p20096.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20098[0...3] CI: ADD 1 inputs / ADD 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities X0, X1, X2, X3 of instance ADD 1 of the adder.
Index: [0] = Input X0
[1] = Input X1
[2] = Input X2
[3] = Input X3

r20099 CO: ADD 1 output Y / ADD 1 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the output quantity Y = X0 + X1 + X2 + X3 of instance ADD 1 of the adder.

p20100 ADD 1 RTG / ADD 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance ADD 1 of the adder should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20101 ADD 1 run sequence / ADD 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	220

Description: Setting parameter for the run sequence of instance ADD 1 within the run-time group set in p20100.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20102[0...1] CI: SUB 0 inputs / SUB 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of minuend X1 and subtracter X2 of instance SUB 0 of the subtracter.
Index: [0] = Minuend X1
[1] = Subtrahend X2

r20103 CO: SUB 0 difference Y / SUB 0 difference Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the difference Y = X1-X2 of instance SUB 0 of the subtracter.

p20104 SUB 0 RTG / SUB 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance SUB 0 of the subtracter should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20105 SUB 0 run sequence / SUB 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	240

Description: Setting parameter for the run sequence of instance SUB 0 within the run-time group set in p20104.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20106[0...1] CI: SUB 1 inputs / SUB 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of minuend X1 and subtracter X2 of instance SUB 1 of the subtracter.
Index: [0] = Minuend X1
[1] = Subtrahend X2

r20107 CO: SUB 1 difference Y / SUB 1 difference Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the difference Y = X1-X2 of instance SUB 1 of the subtracter.

p20108 SUB 1 RTG / SUB 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance SUB 1 of the subtracter should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20109 SUB 1 run sequence / SUB 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7220
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	250

Description: Setting parameter for the run sequence of instance SUB 1 within the run-time group set in p20108.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20110[0...3] CI: MUL 0 inputs / MUL 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of the factors X0, X1, X2, X3 of instance MUL 0 of the multiplier.
Index: [0] = Factor X0
[1] = Factor X1
[2] = Factor X2
[3] = Factor X3

r20111 CO: MUL 0 product Y / MUL 0 product Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the product Y = X0 * X1 * X2 * X3 of instance MUL 0 of the multiplier.

p20112 MUL 0 RTG / MUL 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance MUL 0 of the multiplier should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20113 MUL 0 run sequence / MUL 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	270

Description: Setting parameter for the run sequence of instance MUL 0 within the run-time group set in p20112.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20114[0...3] CI: MUL 1 inputs / MUL 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of the factors X0, X1, X2, X3 of instance MUL 1 of the multiplier.
Index: [0] = Factor X0
[1] = Factor X1
[2] = Factor X2
[3] = Factor X3

r20115 CO: MUL 1 product Y / MUL 1 product Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the product Y = X0 * X1 * X2 * X3 of instance MUL 1 of the multiplier.

p20116 MUL 1 RTG / MUL 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance MUL 1 of the multiplier should be called.
Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20117 MUL 1 run sequence / MUL 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	280

Description: Setting parameter for the run sequence of instance MUL 1 within the run-time group set in p20116.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20118[0...1] CI: DIV 0 inputs / DIV 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of dividend X1 and divisor X2 of instance DIV 0 of the divider.
Index: [0] = Dividend X1
[1] = Divisor X2

r20119[0...2] CO: DIV 0 quotient / DIV 0 quotient

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the quotients Y = X1 / X2, the integer number quotients YIN and for the division remainder MOD of instance DIV 0 of the divider.
Index: [0] = Quotient Y
[1] = Integer number quotient YIN
[2] = Division remainder MOD

r20120 BO: DIV 0 divisor is zero QF / DIV 0 divisor=0 QF

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the signal QF that the divisor X2 of instance DIV 0 of the divider is zero.
X2 = 0.0 => QF = 1

p20121 DIV 0 RTG / DIV 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance DIV 0 of the divider should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20122 DIV 0 run sequence / DIV 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	300

Description: Setting parameter for the run sequence of instance DIV 0 within the run-time group set in p20121.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20123[0...1] CI: DIV 1 inputs / DIV 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of dividend X1 and divisor X2 of instance DIV 1 of the divider.
Index: [0] = Dividend X1
[1] = Divisor X2

r20124[0...2] CO: DIV 1 quotient / DIV 1 quotient

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the quotients Y = X1 / X2, the integer number quotients YIN and for the division remainder MOD of instance DIV 1 of the divider.
Index: [0] = Quotient Y
[1] = Integer number quotient YIN
[2] = Division remainder MOD

r20125 BO: DIV 1 divisor is zero QF / DIV 1 divisor=0 QF

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the signal QF that the divisor X2 of instance DIV 1 of the divider is zero.
X2 = 0.0 => QF = 1

p20126 DIV 1 RTG / DIV 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance DIV 1 of the divider should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20127 DIV 1 run sequence / DIV 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7222
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	310

Description: Setting parameter for the run sequence of instance DIV 1 within the run-time group set in p20126.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20128 CI: AVA 0 input X / AVA 0 input X

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7224
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of the input quantity X of instance AVA 0 of the absolute value generator with sign evaluation.

r20129 CO: AVA 0 output Y / AVA 0 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7224
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output quantity Y of instance AVA 0 of the absolute value generator with sign evaluation.

r20130 BO: AVA 0 input negative SN / AVA 0 input neg SN

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7224
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	-

Description: Display parameter for signal SN that the input quantity X of instance AVA 0 of the absolute value generator with sign evaluation is negative.
X < 0.0 => SN = 1

p20131 AVA 0 RTG / AVA 0 RTG

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Integer16
Dynamic index: -
Function diagram: 7224
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance AVA 0 of the absolute value generator with sign evaluation should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20132 AVA 0 run sequence / AVA 0 RunSeq

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned16
Dynamic index: -
Function diagram: 7224
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	32000	340

Description: Setting parameter for the run sequence of instance AVA 0 within the run-time group set in p20131.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20133 CI: AVA 1 input X / AVA 1 input X

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7224
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of the input quantity X of instance AVA 1 of the absolute value generator with sign evaluation.

r20134 CO: AVA 1 output Y / AVA 1 output Y

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Floating Point
Dynamic index: -
Function diagram: 7224
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output quantity Y of instance AVA 1 of the absolute value generator with sign evaluation.

r20135 BO: AVA 1 input negative SN / AVA 1 input neg SN

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7224
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	-

Description: Display parameter for signal SN that the input quantity X of instance AVA 1 of the absolute value generator with sign evaluation is negative.
X < 0.0 => SN = 1

p20136 AVA 1 RTG / AVA 1 RTG

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Integer16
Dynamic index: -
Function diagram: 7224
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance AVA 1 of the absolute value generator with sign evaluation should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20137 AVA 1 run sequence / AVA 1 RunSeq

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned16
Dynamic index: -
Function diagram: 7224
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	32000	350

Description: Setting parameter for the run sequence of instance AVA 1 within the run-time group set in p20136.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20138 BI: MFP 0 input pulse I / MFP 0 inp_pulse I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the input pulse I of instance MFP 0 of the pulse generator.

p20139 MFP 0 pulse duration in ms / MFP 0 pulse_dur ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	60000.00	0.00

Description: Setting parameter for pulse duration T in milliseconds of instance MFP 0 of the pulse generator.

r20140 BO: MFP 0 output Q / MFP 0 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output pulse Q of instance MFP 0 of the pulse generator.

p20141 MFP 0 run-time group / MFP 0 runtime gr.

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance MFP 0 of the pulse generator should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20142 MFP 0 run sequence / MFP 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	370

Description: Setting parameter for the run sequence of instance MFP 0 within the run-time group set in p20141.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20143 BI: MFP 1 input pulse I / MFP 1 inp_pulse I

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7230
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min -	**Max** -	**Factory setting** 0

Description: Sets the signal source for the input pulse I of instance MFP 1 of the pulse generator.

p20144 MFP 1 pulse duration in ms / MFP 1 pulse_dur ms

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Floating Point	**Dynamic index:** -	**Function diagram:** 7230
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min 0.00	**Max** 60000.00	**Factory setting** 0.00

Description: Setting parameter for pulse duration T in milliseconds of instance MFP 1 of the pulse generator.

r20145 BO: MFP 1 output Q / MFP 1 output Q

FBL-Object (FBL)	**Can be changed:** -		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7230
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min -	**Max** -	**Factory setting** -

Description: Display parameter for output pulse Q of instance MFP 1 of the pulse generator.

p20146 MFP 1 run-time group / MFP 1 runtime gr.

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance MFP 1 of the pulse generator should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20147 MFP 1 run sequence / MFP 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	380

Description: Setting parameter for the run sequence of instance MFP 1 within the run-time group set in p20146.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20148 BI: PCL 0 input pulse I / PCL 0 inp_pulse I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the input pulse I of instance PCL 0 of the pulse shortener.

p20149 PCL 0 pulse duration in ms / PCL 0 pulse_dur ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	60000.00	0.00

Description: Setting parameter for pulse duration T in milliseconds of instance PCL 0 of the pulse shortener.

r20150 BO: PCL 0 output Q / PCL 0 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output pulse Q of instance PCL 0 of the pulse shortener.

p20151 PCL 0 RTG / PCL 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance PCL 0 of the pulse shortener should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20152 PCL 0 run sequence / PCL 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	400

Description: Setting parameter for the run sequence of instance PCL 0 within the run-time group set in p20151.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20153 BI: PCL 1 input pulse I / PCL 1 inp_pulse I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the input pulse I of instance PCL 1 of the pulse shortener.

p20154 PCL 1 pulse duration in ms / PCL 1 pulse_dur ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	60000.00	0.00

Description: Setting parameter for pulse duration T in milliseconds of instance PCL 1 of the pulse shortener.

r20155 BO: PCL 1 output Q / PCL 1 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output pulse Q of instance PCL 1 of the pulse shortener.

p20156 PCL 1 RTG / PCL 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance PCL 1 of the pulse shortener should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20157 PCL 1 run sequence / PCL 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7230
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	410

Description: Setting parameter for the run sequence of instance PCL 1 within the run-time group set in p20156.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20158 BI: PDE 0 input pulse I / PDE 0 inp_pulse I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the input pulse I of instance PDE 0 of the switch-in delay element.

p20159 PDE 0 pulse delay time in ms / PDE 0 t_del ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	60000.00	0.00

Description: Setting parameter for pulse delay time T in milliseconds of instance PDE 0 of the switch-in delay element.

r20160 BO: PDE 0 output Q / PDE 0 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output pulse Q of instance PDE 0 of the switch-in delay element.

p20161 PDE 0 RTG / PDE 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance PDE 0 of the switch-in delay element should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20162 PDE 0 run sequence / PDE 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	430

Description: Setting parameter for the run sequence of instance PDE 0 within the run-time group set in p20161.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20163 BI: PDE 1 input pulse I / PDE 1 inp_pulse I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the input pulse I of instance PDE 1 of the switch-in delay element.

p20164 PDE 1 pulse delay time in ms / PDE 1 t_del ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	60000.00	0.00

Description: Setting parameter for pulse delay time T in milliseconds of instance PDE 1 of the switch-in delay element.

r20165 BO: PDE 1 output Q / PDE 1 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output pulse Q of instance PDE 1 of the switch-in delay element.

p20166 PDE 1 run-time group / PDE 1 runtime gr.

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance PDE 1 of the switch-in delay element should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20167 PDE 1 run sequence / PDE 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	440

Description: Setting parameter for the run sequence of instance PDE 1 within the run-time group set in p20166.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20168 BI: PDF 0 input pulse I / PDF 0 inp_pulse I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the input pulse I of instance PDF 0 of the switch-out delay element.

p20169 PDF 0 pulse extension time in ms / PDF 0 t_ext ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	60000.00	0.00

Description: Setting parameter for pulse extension time T in milliseconds of instance PDF 0 of the switch-out delay element.

r20170 BO: PDF 0 output Q / PDF 0 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output pulse Q of instance PDF 0 of the switch-out delay element.

p20171 PDF 0 RTG / PDF 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance PDF 0 of the switch-out delay element should to be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20172 PDF 0 run sequence / PDF 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	460

Description: Setting parameter for the run sequence of instance PDF 0 within the run-time group set in p20171.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20173 BI: PDF 1 input pulse I / PDF 1 inp_pulse I

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the input pulse I of instance PDF 1 of the switch-out delay element.

p20174 PDF 1 pulse extension time in ms / PDF 1 t_ext ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7232
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	60000.00	0.00

Description: Setting parameter for pulse extension time T in milliseconds of instance PDF 1 of the switch-out delay element.

r20175 BO: PDF 1 output Q / PDF 1 output Q

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7232
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output pulse Q of instance PDF 1 of the switch-out delay element.

p20176 PDF 1 run-time group / PDF 1 runtime gr.

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Integer16
Dynamic index: -
Function diagram: 7232
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance PDF 1 of the switch-out delay element should to be called.

Values:

0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20177 PDF 1 run sequence / PDF 1 RunSeq

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned16
Dynamic index: -
Function diagram: 7232
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	32000	470

Description: Setting parameter for the run sequence of instance PDF 1 within the run-time group set in p20176.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20178[0...1] BI: PST 0 inputs / PST 0 inputs

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7234
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for input pulse I and the reset input R of instance PST 0 of the pulse extension element.

Index:
[0] = Input pulse I
[1] = Reset input R

p20179 PST 0 pulse duration in ms / PST 0 pulse dur ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7234
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	60000.00	0.00

Description: Setting parameter for pulse duration T in milliseconds of instance PST 0 of the pulse extension element.

r20180 BO: PST 0 output Q / PST 0 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7234
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the output pulse Q of instance PST 0 of the pulse extension element.

p20181 PST 0 RTG / PST 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7234
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance PST 0 of the pulse extension element should be called.

Values:

0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20182 PST 0 run sequence / PST 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7234
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	7999	490

Description: Setting parameter for the run sequence of instance PST 0 within the run-time group set in p20181.

The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20183[0...1] BI: PST 1 inputs / PST 1 inputs

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7234
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min -	**Max** -	**Factory setting** 0

Description: Sets the signal source for input pulse I and the reset input R of instance PST 1 of the pulse extension element.

Index: [0] = Input pulse I
[1] = Reset input R

p20184 PST 1 pulse duration in ms / PST 1 pulse_dur ms

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Floating Point	**Dynamic index:** -	**Function diagram:** 7234
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min 0.00	**Max** 60000.00	**Factory setting** 0.00

Description: Setting parameter for pulse duration T in milliseconds of instance PST 1 of the pulse extension element.

r20185 BO: PST 1 output Q / PST 1 output Q

FBL-Object (FBL)	**Can be changed:** -		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7234
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min -	**Max** -	**Factory setting** -

Description: Display parameter for output pulse Q of instance PST 1 of the pulse extension element.

p20186 PST 1 RTG / PST 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7234
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance PST 1 of the pulse extension element should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20187 PST 1 run sequence / PST 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7234
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	7999	500

Description: Setting parameter for the run sequence of instance PST 1 within the run-time group set in p20186.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20188[0...1] BI: RSR 0 inputs / RSR 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7240
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for set input S and reset input R of instance RSR 0 of the RS flipflop.
Index: [0] = Set S
[1] = Reset R

r20189 BO: RSR 0 output Q / RSR 0 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7240
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output Q of instance RSR 0 of the RS flipflop.

r20190 BO: RSR 0 inverted output QN / RSR 0 inv outp QN

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7240
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	-

Description: Display parameter for inverted output QN of instance RSR 0 of the RS flipflop.

p20191 RSR 0 RTG / RSR 0 RTG

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Integer16
Dynamic index: -
Function diagram: 7240
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance RSR 0 of the RS flipflop should be called.

Values:

0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20192 RSR 0 run sequence / RSR 0 RunSeq

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned16
Dynamic index: -
Function diagram: 7240
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	7999	520

Description: Setting parameter for the run sequence of instance RSR 0 within the run-time group set in p20191.

The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20193[0...1] BI: RSR 1 inputs / RSR 1 inputs

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7240
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for set input S and reset input R of instance RSR 1 of the RS flipflop.

Index:

[0] = Set S
[1] = Reset R

r20194 BO: RSR 1 output Q / RSR 1 output Q

FBL-Object (FBL)

Can be changed: -		**Access level:** 1
Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7240
P-Group: -	**Units group:** -	**Unit selection:** -
Min -	**Max** -	**Factory setting** -

Description: Display parameter for output 0 of instance RSR 1 of the RS flipflop.

r20195 BO: RSR 1 inverted output QN / RSR 1 inv outp QN

FBL-Object (FBL)

Can be changed: -		**Access level:** 1
Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7240
P-Group: -	**Units group:** -	**Unit selection:** -
Min -	**Max** -	**Factory setting** -

Description: Display parameter for inverted output QN of instance RSR 1 of the RS flipflop.

p20196 RSR 1 RTG / RSR 1 RTG

FBL-Object (FBL)

Can be changed: T		**Access level:** 1
Data type: Integer16	**Dynamic index:** -	**Function diagram:** 7240
P-Group: -	**Units group:** -	**Unit selection:** -
Min 0	**Max** 9999	**Factory setting** 9999

Description: Setting parameter for the run-time group in which instance RSR 1 of the RS flipflop should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20197 RSR 1 run sequence / RSR 1 RunSeq

FBL-Object (FBL)

Can be changed: T		**Access level:** 1
Data type: Unsigned16	**Dynamic index:** -	**Function diagram:** 7240
P-Group: -	**Units group:** -	**Unit selection:** -
Min 0	**Max** 7999	**Factory setting** 530

Description: Setting parameter for the run sequence of instance RSR 1 within the run-time group set in p20196.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20198[0...3] BI: DFR 0 inputs / DFR 0 inputs

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7240
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	-	-	0

Description: Sets the signal source of trigger input I, of D input D, of set input S and reset input R of instance DFR 0 of the D flip-flop.

Index:
[0] = Trigger input I
[1] = D input D
[2] = Set S
[3] = Reset R

r20199 BO: DFR 0 output Q / DFR 0 output Q

FBL-Object (FBL)	**Can be changed:** -		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7240
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	-	-	-

Description: Display parameter for output Q of instance DFR 0 of the D flipflop.

r20200 BO: DFR 0 inverted output QN / DFR 0 inv outp QN

FBL-Object (FBL)	**Can be changed:** -		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7240
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	-	-	-

Description: Display parameter for the inverted output QN of instance DFR 0 of the D flipflop.

p20201 DFR 0 RTG / DFR 0 RTG

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Integer16	**Dynamic index:** -	**Function diagram:** 7240
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	0	9999	9999

Description: Setting parameter for the run-time group in which instance DFR 0 of the D flipflop should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20202 DFR 0 run sequence / DFR 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7240
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	550

Description: Setting parameter for the run sequence of instance DFR 0 within the run-time group set in p20201.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20203[0...3] BI: DFR 1 inputs / DFR 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7240
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of trigger input I, of D input D, of set input S and reset input R of instance DFR 1 of the D flip-flop.

Index: [0] = Trigger input I
[1] = D input D
[2] = Set S
[3] = Reset R

r20204 BO: DFR 1 output Q / DFR 1 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7240
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output Q of instance DFR 1 of the D flipflop.

r20205 BO: DFR 1 inverted output QN / DFR 1 inv outp QN

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7240
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the inverted output QN of instance DFR 1 of the D flipflop.

p20206 DFR 1 RTG / DFR 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7240
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance DFR 1 of the D flipflop should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20207 DFR 1 run sequence / DFR 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7240
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	560

Description: Setting parameter for the run-time group of instance DFR 1 within the run-time group set in p20206.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20208[0...1] BI: BSW 0 inputs / BSW 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0 and I1 of instance BSW 0 of the binary changeover switch.

Index:
[0] = Input I0
[1] = Input I1

p20209 BI: BSW 0 switch setting I / BSW 0 sw_setting

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of the switch setting I of instance BSW 0 of the binary changeover switch.

r20210 BO: BSW 0 output Q / BSW 0 output Q

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7250
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output quantity Q of instance BSW 0 of the binary changeover switch.

p20211 BSW 0 RTG / BSW 0 RTG

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Integer16
Dynamic index: -
Function diagram: 7250
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance BSW 0 of the binary changeover switch should be called.

Values:

0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20212 BSW 0 run sequence / BSW 0 RunSeq

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned16
Dynamic index: -
Function diagram: 7250
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	7999	580

Description: Setting parameter for the run sequence of instance BSW 0 within the run-time group set in p20211.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20213[0...1] BI: BSW 1 inputs / BSW 1 inputs

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7250
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities I0 and I1 of instance BSW 1 of the binary changeover switch.

Index:

[0] = Input I0
[1] = Input I1

p20214 BI: BSW 1 switch setting I / BSW 1 sw_setting

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of the switch setting I of instance BSW 1 of the binary changeover switch.

r20215 BO: BSW 1 output Q / BSW 1 output Q

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output quantity Q of instance BSW 1 of the binary changeover switch.

p20216 BSW 1 RTG / BSW 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance BSW 1 of the binary changeover switch should be called.

Values:

0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20217 BSW 1 run sequence / BSW 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	7999	590

Description: Setting parameter for the run sequence of instance BSW 1 within the run-time group set in p20216.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20218[0...1] CI: NSW 0 inputs / NSW 0 inputs

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7250
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	-	-	0

Description: Sets the signal source of input quantities X0 and X1 of instance NSW 0 of the numeric changeover switch.

Index: [0] = Input X0
[1] = Input X1

p20219 BI: NSW 0 switch setting I / NSW 0 sw_setting

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Unsigned32	**Dynamic index:** -	**Function diagram:** 7250
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	-	-	0

Description: Sets the signal source of the switch setting I of instance NSW 0 of the numeric changeover switch.

r20220 CO: NSW 0 output Y / NSW 0 output Y

FBL-Object (FBL)	**Can be changed:** -		**Access level:** 1
	Data type: Floating Point	**Dynamic index:** -	**Function diagram:** 7250
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	-	-	-

Description: Display parameter for output quantity Y of instance NSW 0 of the numeric changeover switch.

p20221 NSW 0 RTG / NSW 0 RTG

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Integer16	**Dynamic index:** -	**Function diagram:** 7250
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	0	9999	9999

Description: Setting parameter for the run-time group in which the instance NSW 0 of the numeric changeover switch should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20222 NSW 0 run sequence / NSW 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	610

Description: Setting parameter for the run sequence of instance NSW 0 within the run-time group set in p20221.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20223[0...1] CI: NSW 1 inputs / NSW 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantities X0 and X1 of instance NSW 1 of the numeric changeover switch.
Index: [0] = Input X0
[1] = Input X1

p20224 BI: NSW 1 switch setting I / NSW 1 sw_setting

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of the switch setting I of instance NSW 1 of the numeric changeover switch.

r20225 CO: NSW 1 output Y / NSW 1 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output quantity Y of instance NSW 1 of the numeric changeover switch.

p20226 NSW 1 RTG / NSW 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which the instance NSW 1 of the numeric changeover switch should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20227 NSW 1 run sequence / NSW 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7250
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	620

Description: Setting parameter for the run sequence of instance NSW 1 within the run-time group set in p20226.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20228 CI: LIM 0 input X / LIM 0 input X

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity X of instance LIM 0 of the limiter.

p20229 LIM 0 upper limit value LU / LIM 0 upper lim LU

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for the upper limit value LU of instance LIM 0 of the limiter.

p20230 LIM 0 lower limit value LL / LIM 0 lower lim LL

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for the lower limit value LL of instance LIM 0 of the limiter.

r20231 CO: LIM 0 output Y / LIM 0 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the limited output quantity Y of instance LIM 0 of the limiter.

r20232 BO: LIM 0 input quantity at the upper limit QU / LIM 0 QU

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LIM 0 of limiter QU (upper limit reached), i.e. QU = 1 for X >= LU.

r20233 BO: LIM 0 input quantity at the lower limit QL / LIM 0 QL

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LIM 0 of limiter QL (lower limit reached), i.e. QL = 1 for X <= LL.

p20234 LIM 0 RTG / LIM 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance LIM 0 of the limiter should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20235 LIM 0 run sequence / LIM 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	640

Description: Setting parameter for the run sequence of instance LIM 0 within the run-time group set in p20234.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20236 CI: LIM 1 input X / LIM 1 input X

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity X of instance LIM 1 of the limiter.

p20237 LIM 1 upper limit value LU / LIM 1 upper lim LU

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for the upper limit value LU of instance LIM 1 of the limiter.

p20238 LIM 1 lower limit value LL / LIM 1 lower lim LL

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for the lower limit value LL of instance LIM 1 of the limiter.

r20239 CO: LIM 1 output Y / LIM 1 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the limited output quantity Y of instance LIM 1 of the limiter.

r20240 BO: LIM 1 input quantity at the upper limit QU / LIM 1 QU

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7260
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LIM 1 of limiter QU (upper limit reached), i.e. QU = 1 for X >= LU.

r20241 BO: LIM 1 input quantity at the lower limit QL / LIM 1 QL

FBL-Object (FBL)

Can be changed: -
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7260
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LIM 1 of limiter QL (lower limit reached), i.e. QL = 1 for X <= LL.

p20242 LIM 1 RTG / LIM 1 RTG

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Integer16
Dynamic index: -
Function diagram: 7260
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance LIM 1 of the limiter should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20243 LIM 1 run sequence / LIM 1 RunSeq

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned16
Dynamic index: -
Function diagram: 7260
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
0	32000	650

Description: Setting parameter for the run sequence of instance LIM 1 within the run-time group set in p20242.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20244[0...1] CI: PT1 0 inputs / PT1 0 inputs

FBL-Object (FBL)

Can be changed: T
Access level: 1
Data type: Unsigned32
Dynamic index: -
Function diagram: 7262
P-Group: -
Units group: -
Unit selection: -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity X and of setting value SV of instance PT1 0 of the smoothing element.

Index:
[0] = Input X
[1] = Setting value SV

p20245 BI: PT1 0 accept setting value S / PT1 0 acc set val

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the "accept setting value" signal of instant PT1 0 of the smoothing element.

p20246 PT1 0 smoothing time constant in ms / PT1 0 T_smooth ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	340.28235E36	0.00

Description: Sets the smoothing time constant T in milliseconds of instance PT1 0 of the smoothing element.

r20247 CO: PT1 0 output Y / PT1 0 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the smoothed output quantity Y of instance PT1 0 of the smoothing element.

p20248 PT1 RTG / PT1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance PT1 0 of the smoothing element should be called.

Values:

0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20249 PT1 0 run sequence / PT1 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	670

Description: Setting parameter for the run sequence of instance PT1 0 within the run-time group set in p20248.

The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20250[0...1] CI: PT1 1 inputs / PT1 1 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity X and of setting value SV of instance PT1 1 of the smoothing element.

Index: [0] = Input X
[1] = Setting value SV

p20251 BI: PT1 1 accept setting value S / PT1 1 acc set val

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the "accept setting value" signal of instant PT1 1 of the smoothing element.

p20252 PT1 1 smoothing time constant in ms / PT1 1 T_smooth ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	340.28235E36	0.00

Description: Sets the smoothing time constant T in milliseconds of instance PT1 1 of the smoothing element.

r20253 CO: PT1 1 output Y / PT1 1 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the smoothed output quantity Y of instance PT1 1 of the smoothing element.

p20254 PT1 1 RTG / PT1 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance PT1 1 of the smoothing element should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20255 PT1 1 run sequence / PT1 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7262
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	680

Description: Setting parameter for the run sequence of instance PT1 1 within the run-time group set in p20254.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20256[0...1] CI: INT 0 inputs / INT 0 inputs

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity X and of setting value SV of instance INT 0 of the integrator.
Index: [0] = Input X
[1] = Setting value SV

p20257 INT 0 upper limit value LU / INT 0 upper lim LU

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Sets the upper limit value LU of instance INT 0 of the integrator.

p20258 INT 0 lower limit value LL / INT 0 lower lim LL

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Sets the lower limit value LL of instance INT 0 of the integrator.

p20259 INT 0 integrating time constant in ms / INT 0 T_Integr ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	340.28235E36	0.00

Description: Sets the integrating time constant Ti in milliseconds of instance INT 0 of the integrator.

p20260 BI: INT 0 accept setting value S / INT 0 acc set val

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source for the "accept setting value" signal of instant INT 0 of the integrator.

r20261 CO: INT 0 output Y / INT 0 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output quantity Y of instance INT 0 of the integrator.
If LL>= LU, then the output quantity Y = LU.

r20262 BO: INT 0 integrator at the upper limit QU / INT 0 QU

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the signal QU that output quantity Y of instance INT 0 of the integrator has reached the upper limit value LU.

r20263 BO: INT 0 integrator at the lower limit QL / INT 0 QL

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for the signal QL that output quantity Y of instance INT 0 of the integrator has reached the lower limit value LL.

p20264 INT 0 RTG / INT 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance INT 0 of the integrator should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20265 INT 0 run sequence / INT 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	32000	700

Description: Setting parameter for the run sequence of instance INT 0 within the run-time group set in p20264.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20266 CI: LVM 0 input X / LVM 0 input X

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity X of instance LVM 0 of the double-sided limiter.

p20267 LVM 0 interval average value M / LVM 0 avg value M

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for the interval average M of instance LVM 0 of the double-sided limiter.

p20268 LVM 0 interval limit L / LVM 0 limit L

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for the interval limit L of instance LVM 0 of the double-sided limiter.

p20269 LVM 0 hyst HY / LVM 0 hyst HY

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for hysteresis HY of instance LVM 0 of the double-sided limiter.

r20270 BO: LVM 0 input quantity above interval QU / LVM 0 X above QU

FBL-Object (FBL)

Can be changed: - **Access level:** 1
Data type: Unsigned32 **Dynamic index:** - **Function diagram:** 7270
P-Group: - **Units group:** - **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LVM 0 of the double-sided limiter that input quantity X was at least once X > M + L and X is >= M + L - HY.

r20271 BO: LVM 0 input quantity within interval QM / LVM 0 X within QM

FBL-Object (FBL)

Can be changed: - **Access level:** 1
Data type: Unsigned32 **Dynamic index:** - **Function diagram:** 7270
P-Group: - **Units group:** - **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LVM 0 of the double-sided limiter that the input quantity X lies within the interval.

r20272 BO: LVM 0 input quantity below interval QL / LVM 0 X below QL

FBL-Object (FBL)

Can be changed: - **Access level:** 1
Data type: Unsigned32 **Dynamic index:** - **Function diagram:** 7270
P-Group: - **Units group:** - **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LVM 0 of the double-sided limiter that input quantity X was at least once X < M - L and X is <= M - L + HY.

p20273 LVM 0 run-time group / LVM 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance LVM 0 of the double-sided limiter should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20274 LVM 0 run sequence / LVM 0 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	7999	720

Description: Setting parameter for the run sequence of instance LVM 0 within the run-time group set in p20273.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20275 CI: LVM 1 input X / LVM 1 input X

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity X of instance LVM 1 of the double-sided limiter.

p20276 LVM 1 interval average value M / LVM 1 avg value M

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for the interval average M of instance LVM 1 of the double-sided limiter.

p20277 LVM 1 interval limit L / LVM 1 limit L

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for the interval limit L of instance LVM 1 of the double-sided limiter.

p20278 LVM 1 hyst HY / LVM 1 hyst HY

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-340.28235E36	340.28235E36	0.00

Description: Setting parameter for hysteresis HY of instance LVM 1 of the double-sided limiter.

r20279 BO: LVM 1 input quantity above interval QU / LVM 1 X above QU

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LVM 1 of the double-sided limiter that input quantity X was at least once X > M + L and X is >= M + L - HY.

r20280 BO: LVM 1 input quantity within interval QM / LVM 1 X within QM

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LVM 1 of the double-sided limiter that the input quantity X lies within the interval.

r20281 BO: LVM 1 input quantity below interval QL / LVM 1 X below QL

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter of instance LVM 1 of the double-sided limiter that input quantity X was at least once X < M - L and X is <= M - L + HY.

p20282 LVM 1 RTG / LVM 1 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance LVM 1 of the double-sided limiter should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20283 LVM 1 run sequence / LVM 1 RunSeq

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned16 | **Dynamic index:** - | **Function diagram:** 7270
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	7999	730

Description: Setting parameter for the run sequence of instance LVM within the run-time group set in p20282.
The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

p20284 CI: DIF 0 input X / DIF 0 input X

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Unsigned32 | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	0

Description: Sets the signal source of input quantity X of instance DIF 0 of the differentiating element.

p20285 DIF 0 differentiating time constant in ms / DIF 0 T_diff ms

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0.00	340.28235E36	0.00

Description: Sets the differentiating time constant Td in milliseconds of instance DIF 0 of the differentiating element.

r20286 CO: DIF 0 output Y / DIF 0 output Y

FBL-Object (FBL)

Can be changed: - | **Access level:** 1
Data type: Floating Point | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
-	-	-

Description: Display parameter for output quantity Y of instance DIF 0 of the differentiating element.

p20287 DIF 0 run-time group / DIF 0 RTG

FBL-Object (FBL)

Can be changed: T | **Access level:** 1
Data type: Integer16 | **Dynamic index:** - | **Function diagram:** 7264
P-Group: - | **Units group:** - | **Unit selection:** -

Min	Max	Factory setting
0	9999	9999

Description: Setting parameter for the run-time group in which instance DIF 0 of the differentiating element should be called.

Values:
0: Run-time group 0
1: Run-time group 1
2: Run-time group 2
3: Run-time group 3
4: Run-time group 4
5: Run-time group 5
6: Run-time group 6
7: Run-time group 7
8: Run-time group 8
9: Run-time group 9
9999: Do not calculate

p20288 DIF 0 run sequence / DIF 0 RunSeq

FBL-Object (FBL)	**Can be changed:** T		**Access level:** 1
	Data type: Unsigned16	**Dynamic index:** -	**Function diagram:** 7264
	P-Group: -	**Units group:** -	**Unit selection:** -
	Min	**Max**	**Factory setting**
	0	32000	750

Description: Setting parameter for the run sequence of instance DIF 0 within the run-time group set in p20287.

The functions blocks with a lower run sequence value are calculated before function blocks with a higher run sequence value.

Function Diagrams 3

Content

3.1 Directory of function diagrams

3.2 Explanations for the function diagrams

Function diagrams

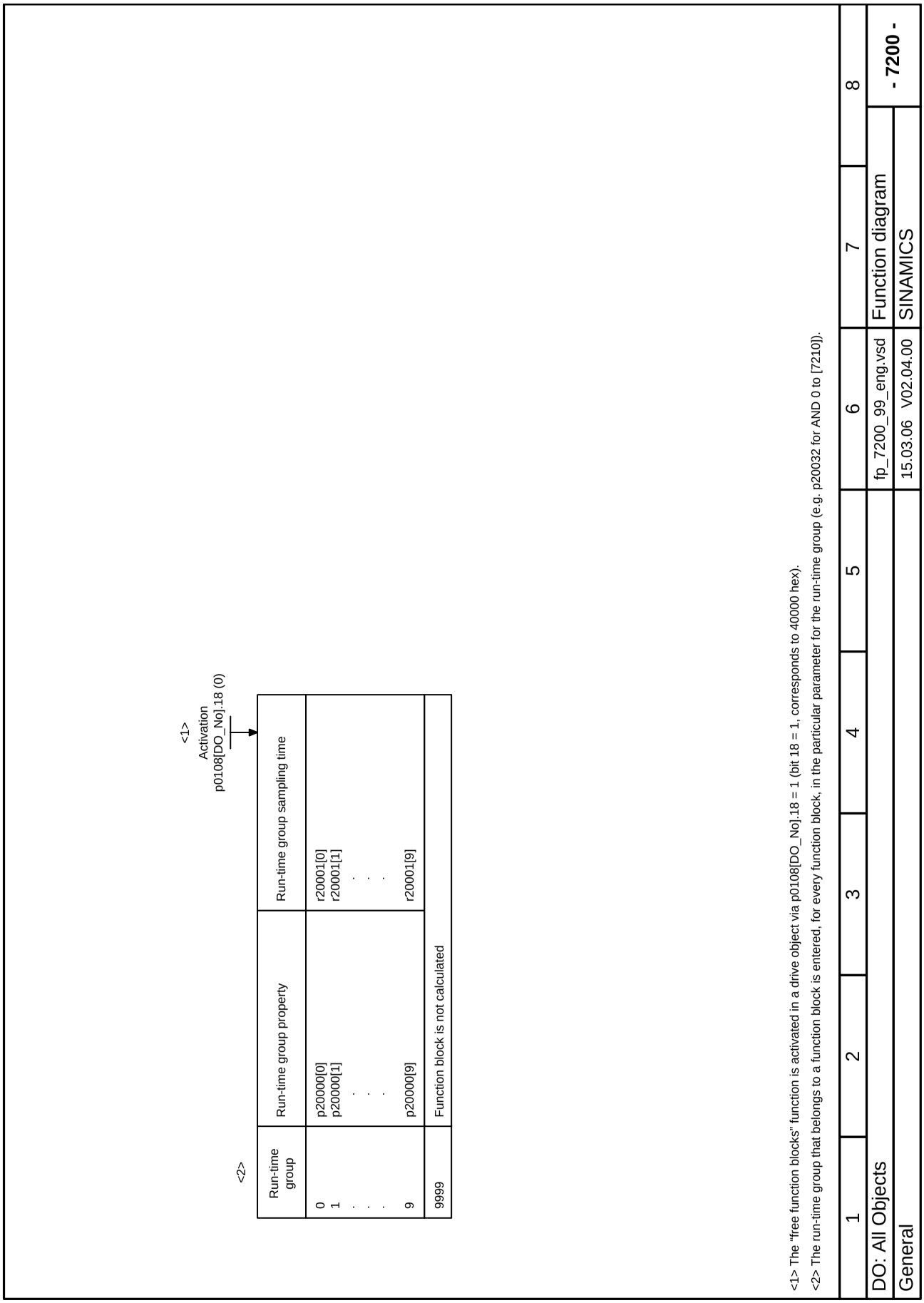

Fig. 3-1 7200 – General information

3.3 Logic function blocks

Function diagrams

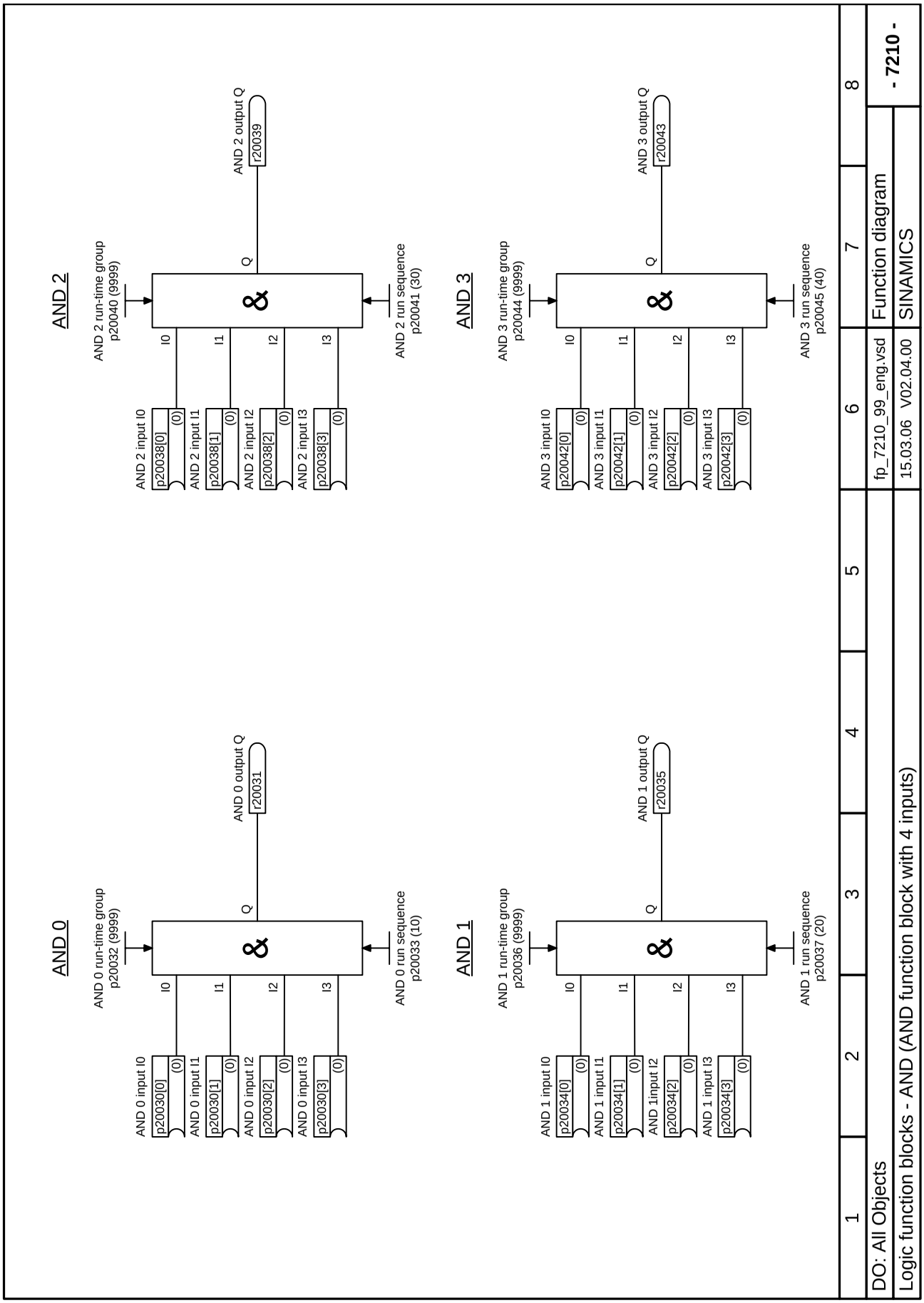

Fig. 3-2 7210 – AND (AND function block with four inputs)

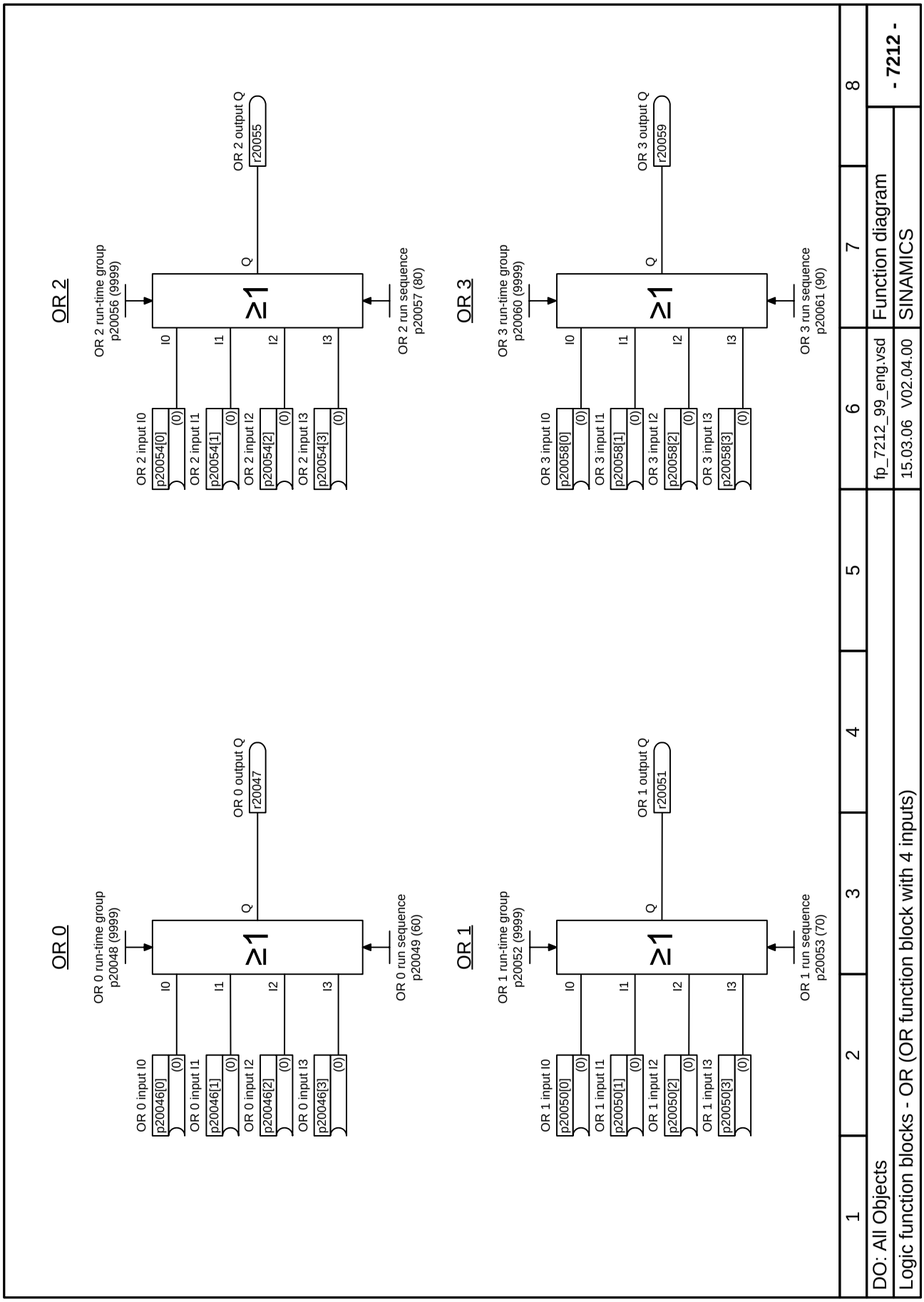

Fig. 3-3 7212 – OR (OR function block with four inputs)

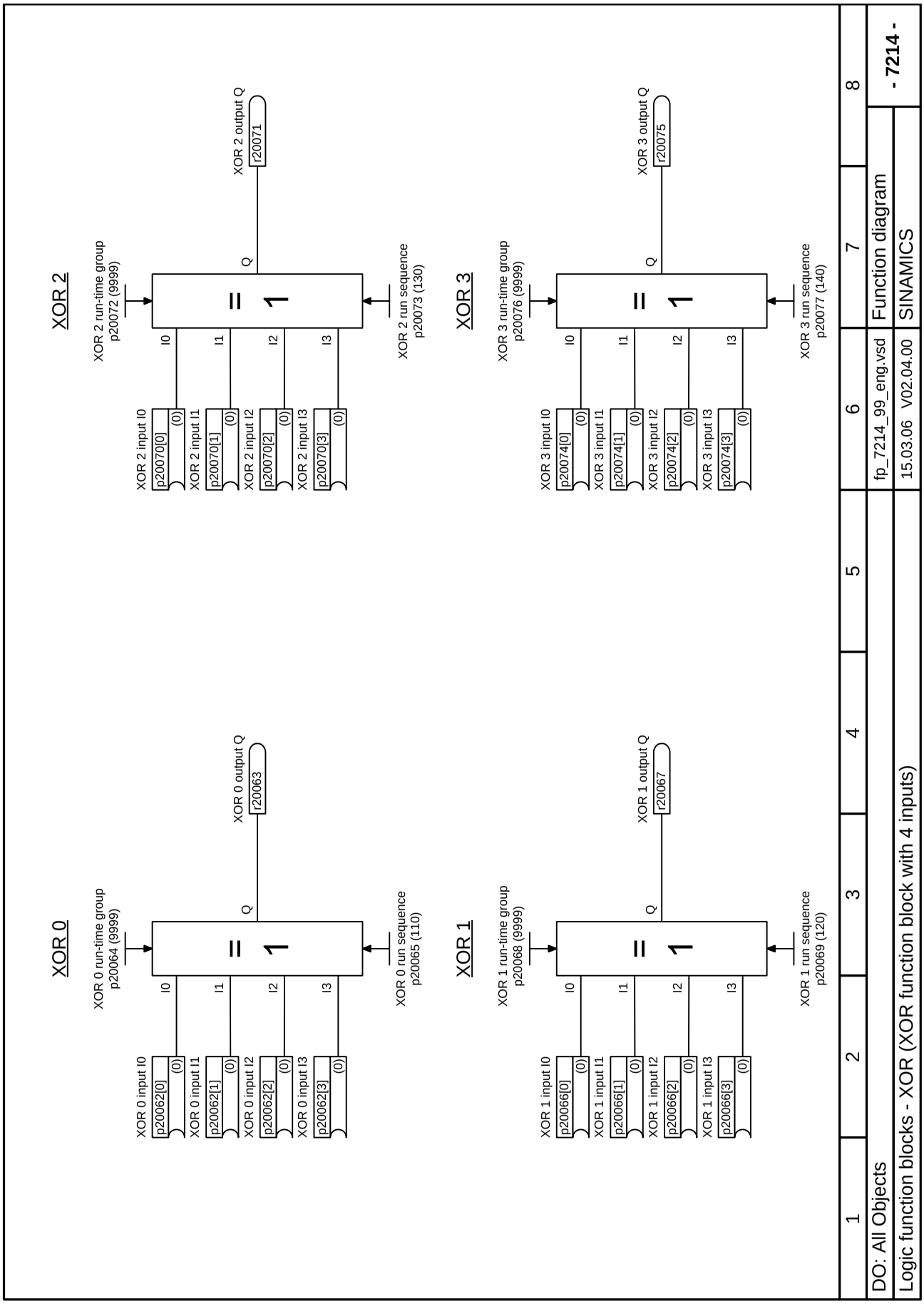

Fig. 3-4 7214 – XOR (XOR function block with four inputs)

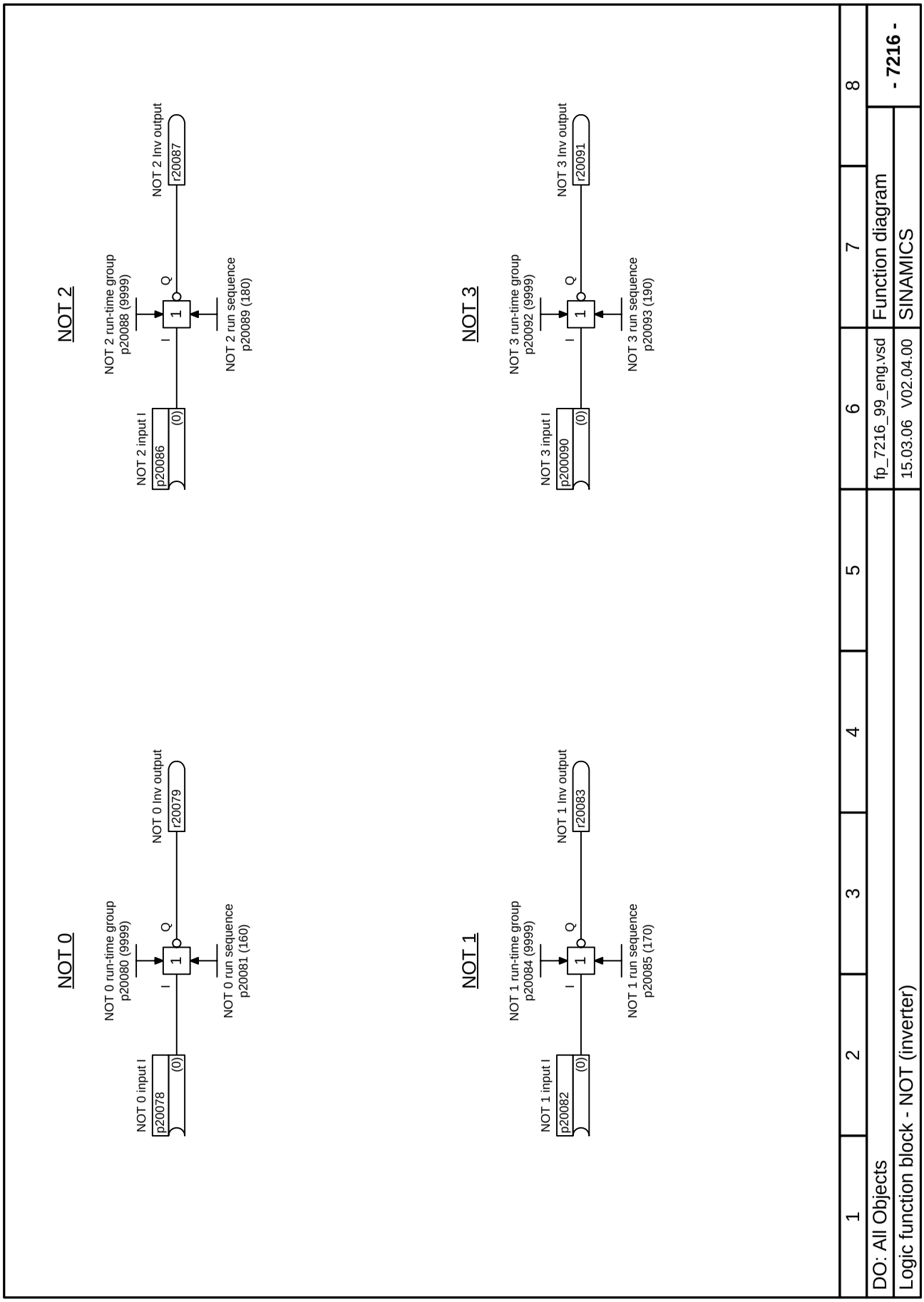

Fig. 3-5 7216 – NOT (Inverter)

3.4 Arithmetic function blocks

Function diagrams

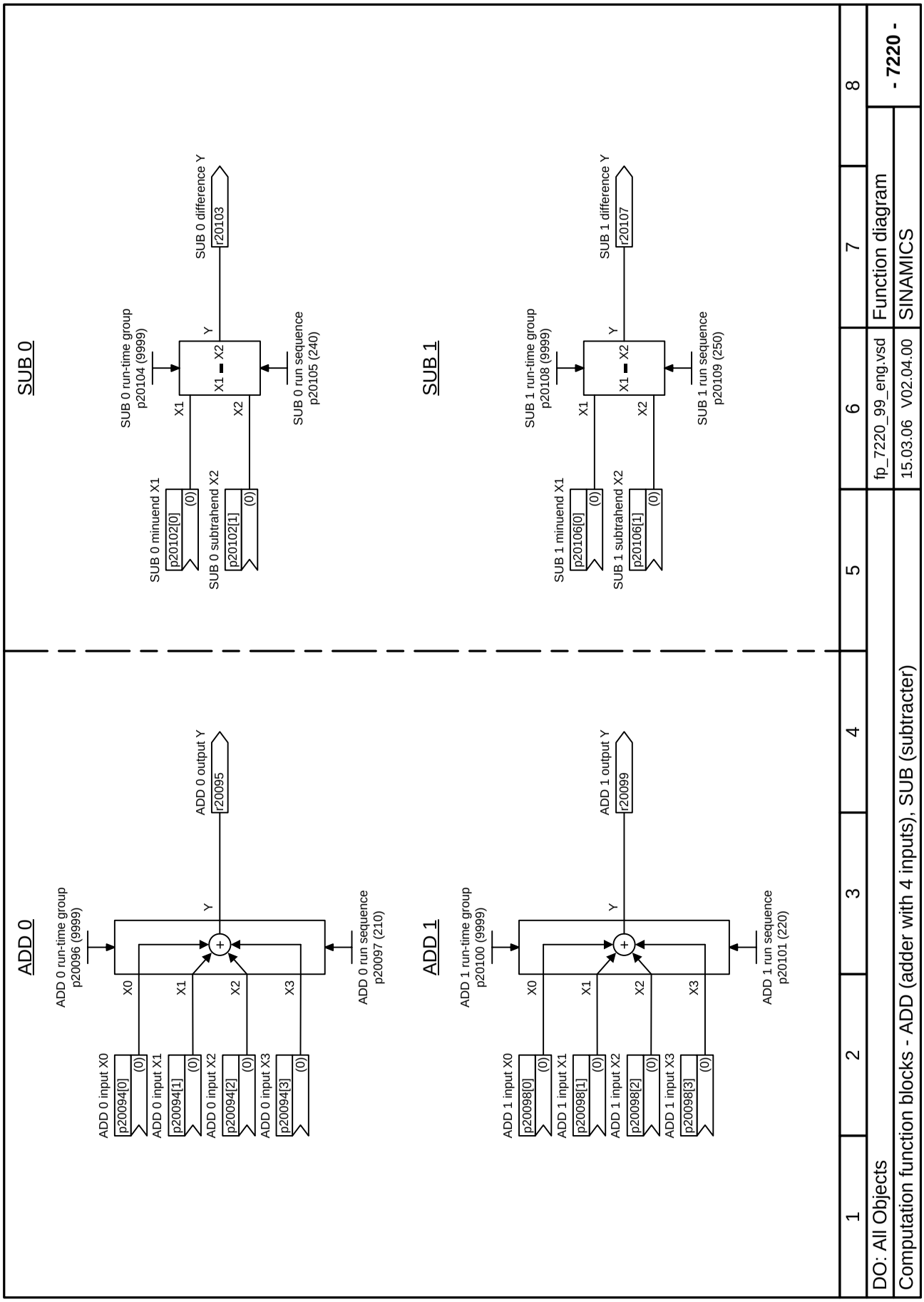

Fig. 3-6 7220 – ADD (adder with four inputs), SUB (subtracter)

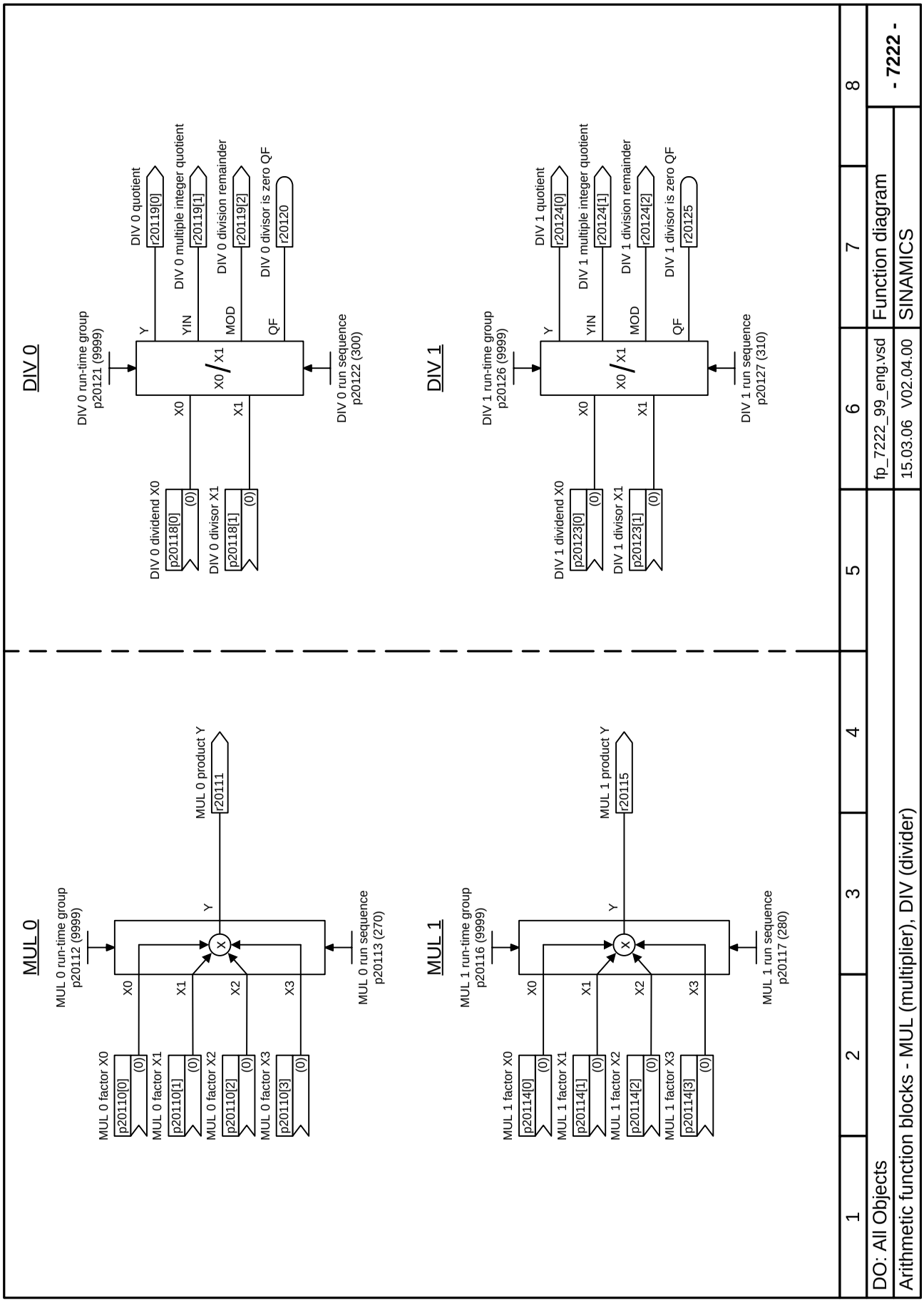

Fig. 3-7 7222 – MUL (multiplier), DIV (divider)

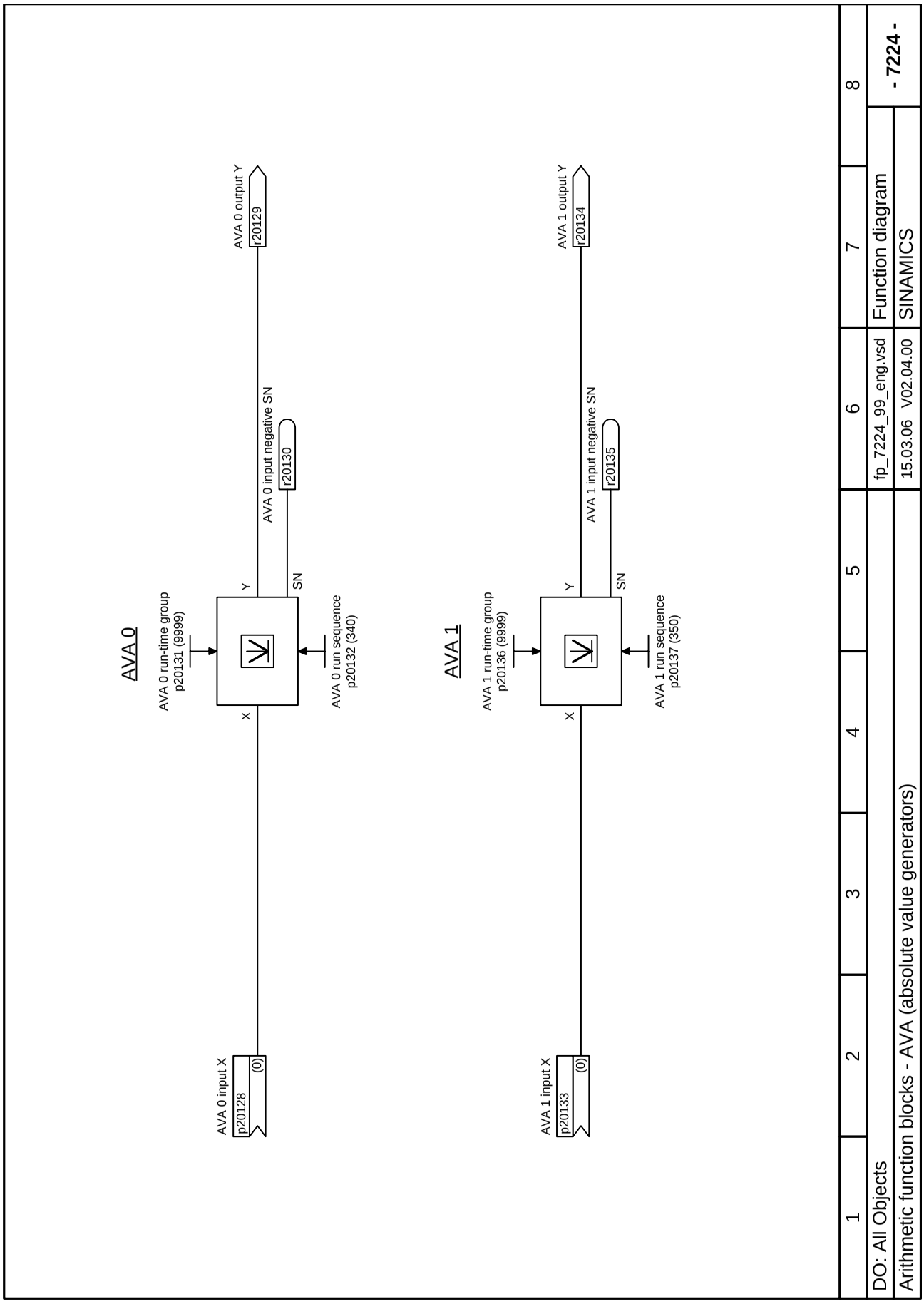

Fig. 3-8 7224 – AVA (absolute value generator)

3.5 Time function blocks

Function diagrams

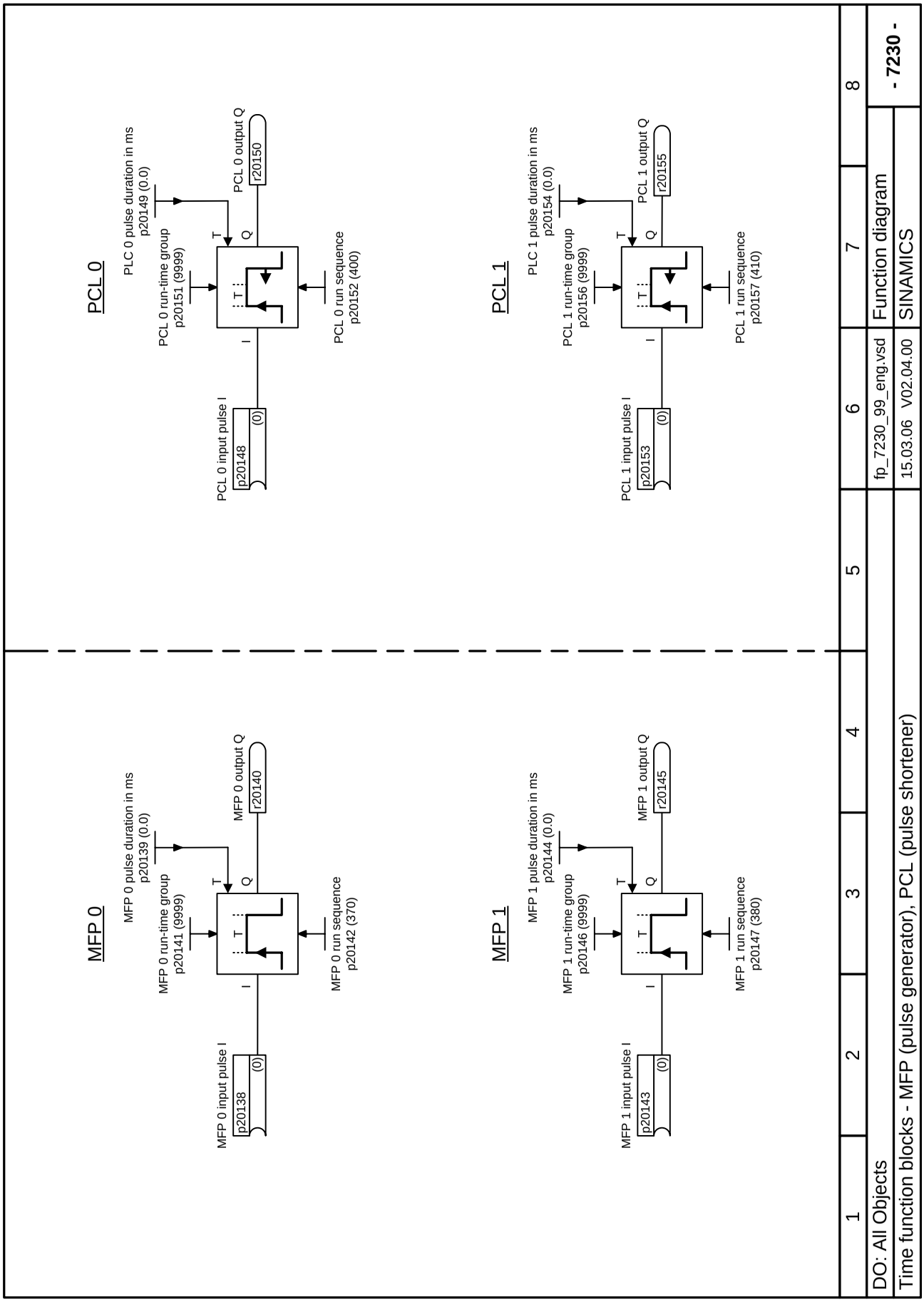

Fig. 3-9 7230 – MFP (pulse generator), PCL (pulse contractor)

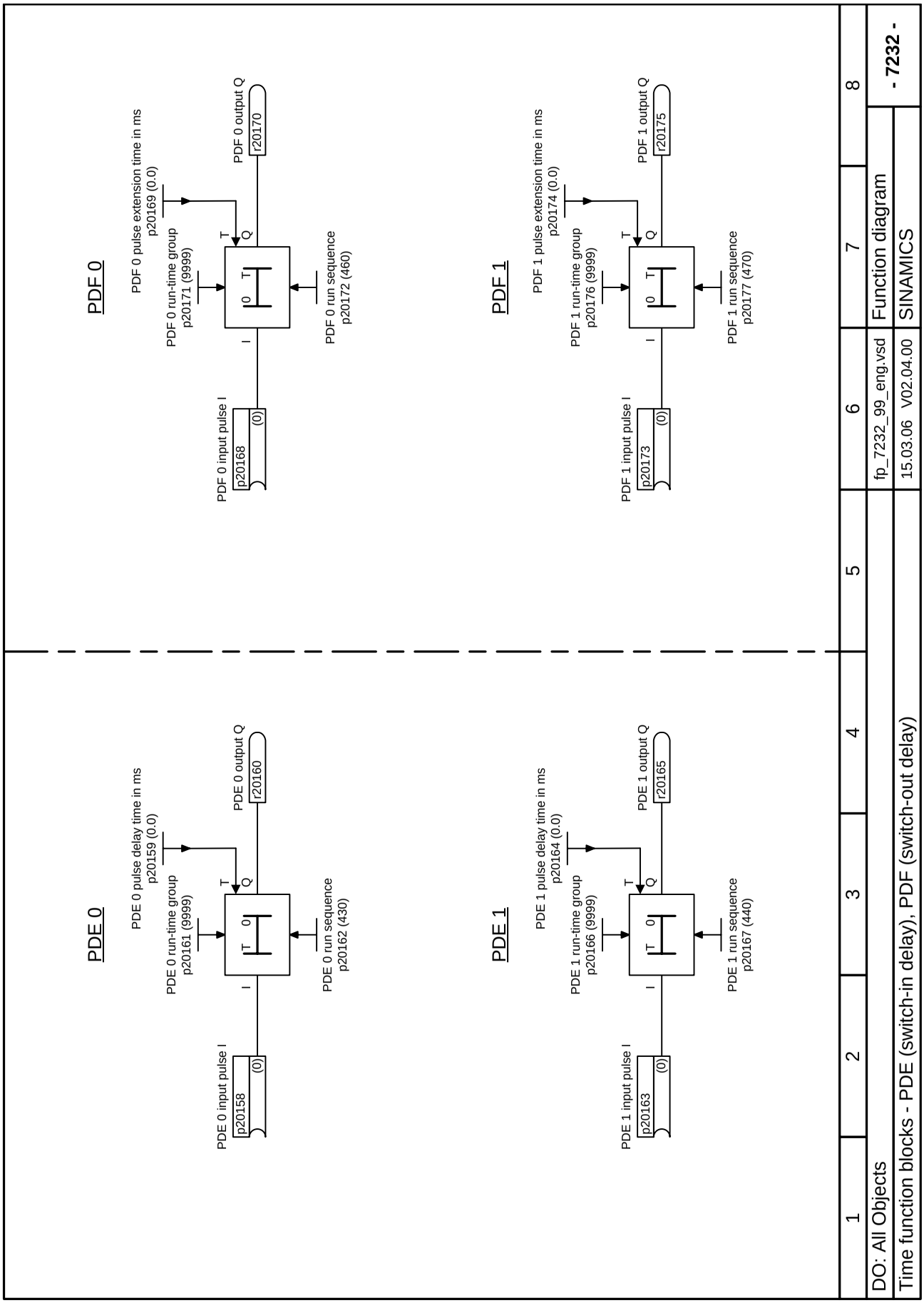

Fig. 3-10 7232 – PDE (ON delay), PDF (OFF delay)

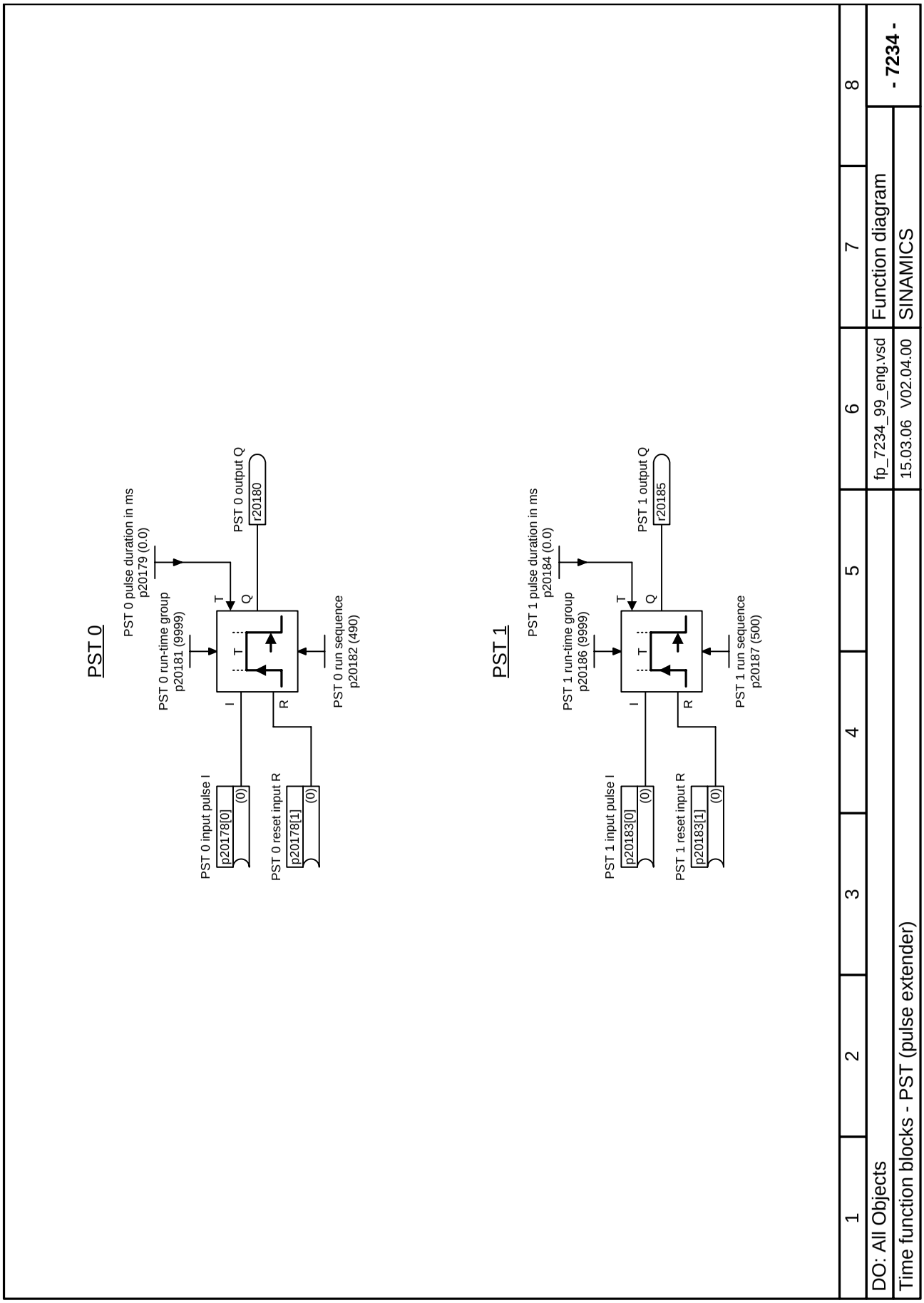

Fig. 3-11 7234 – PST (pulse stretcher)

3.6 Memory function blocks

Function diagrams

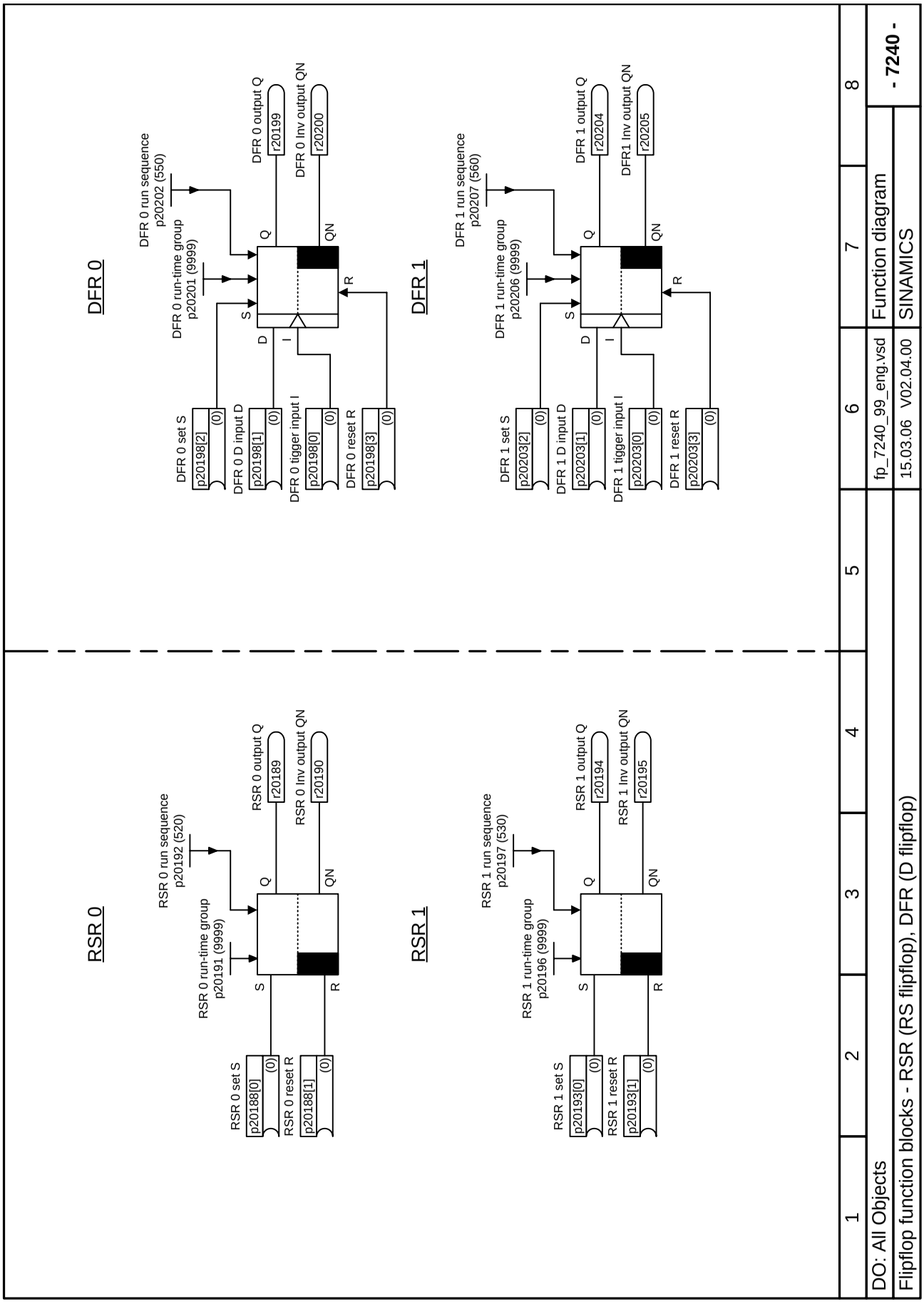

Fig. 3-12 7240 – RSR (RS flip-flop), DFR (D flip-flop)

3.7 Switch function blocks

Function diagrams

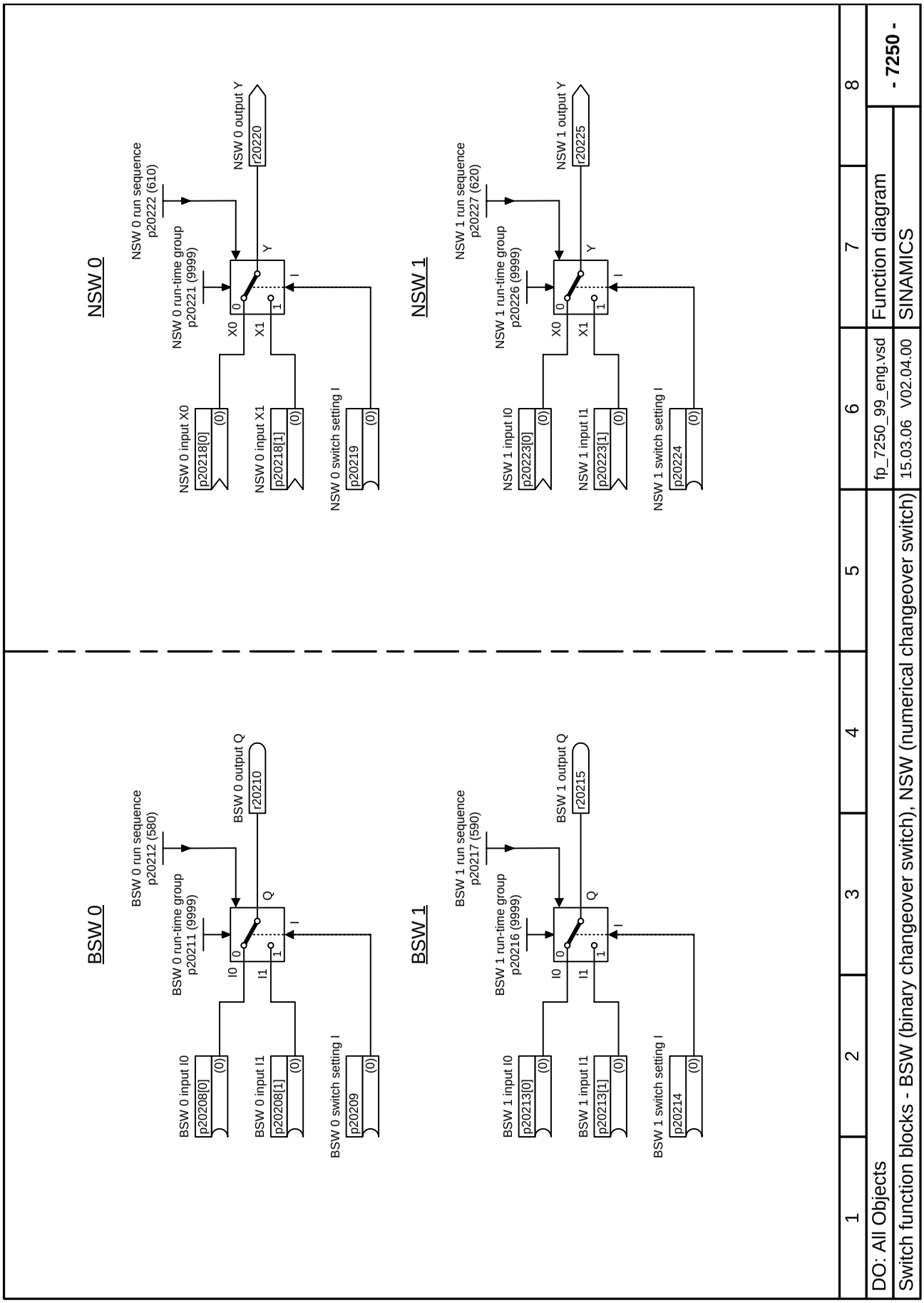

Fig. 3-13 7250 – BSW (binary switch), NSW (numeric switch)

3.8 Control function blocks

Function diagrams

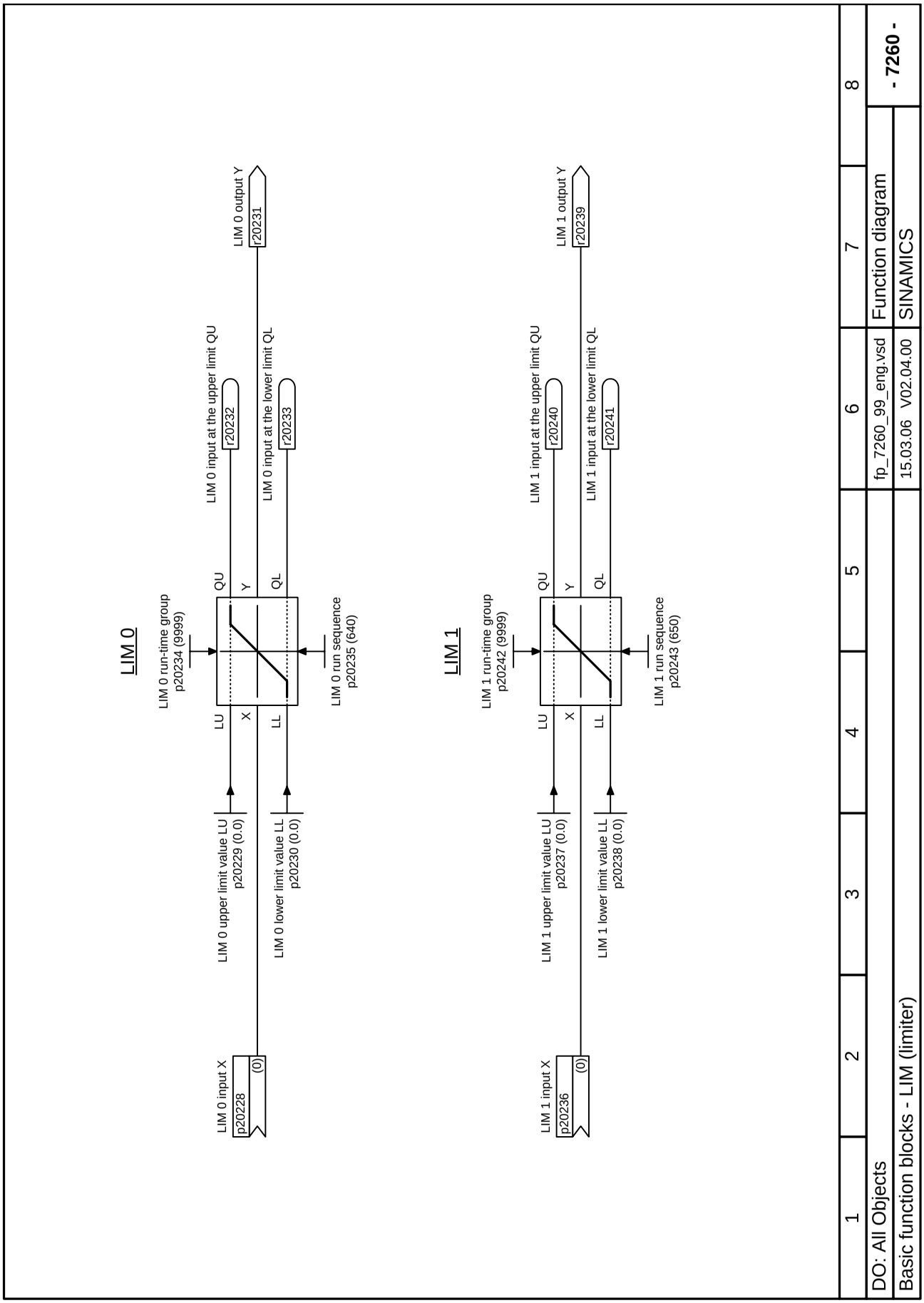

Fig. 3-14 7260 – LIM (limiter)

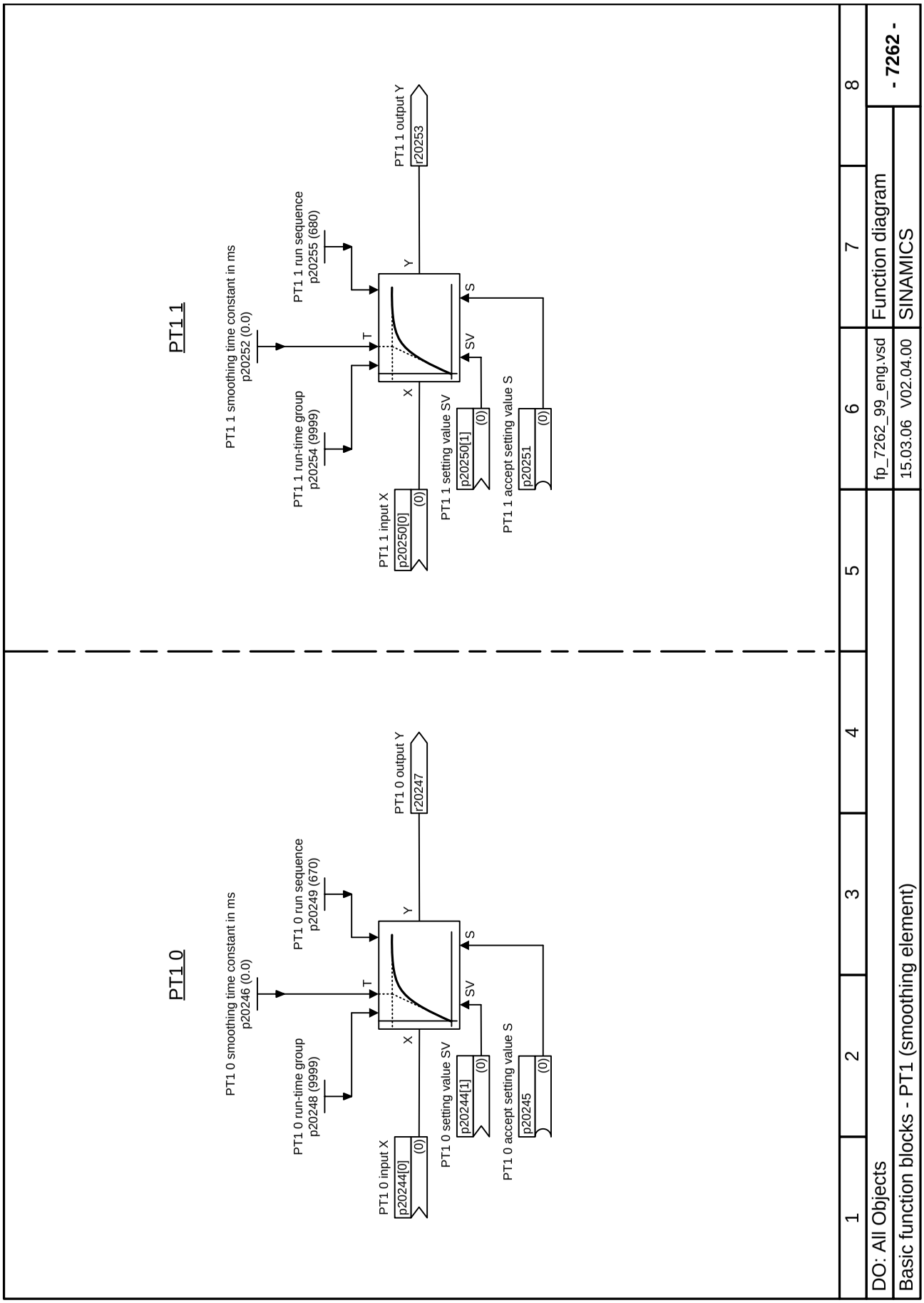

Fig. 3-15 7262 – PT1 (smoothing element)

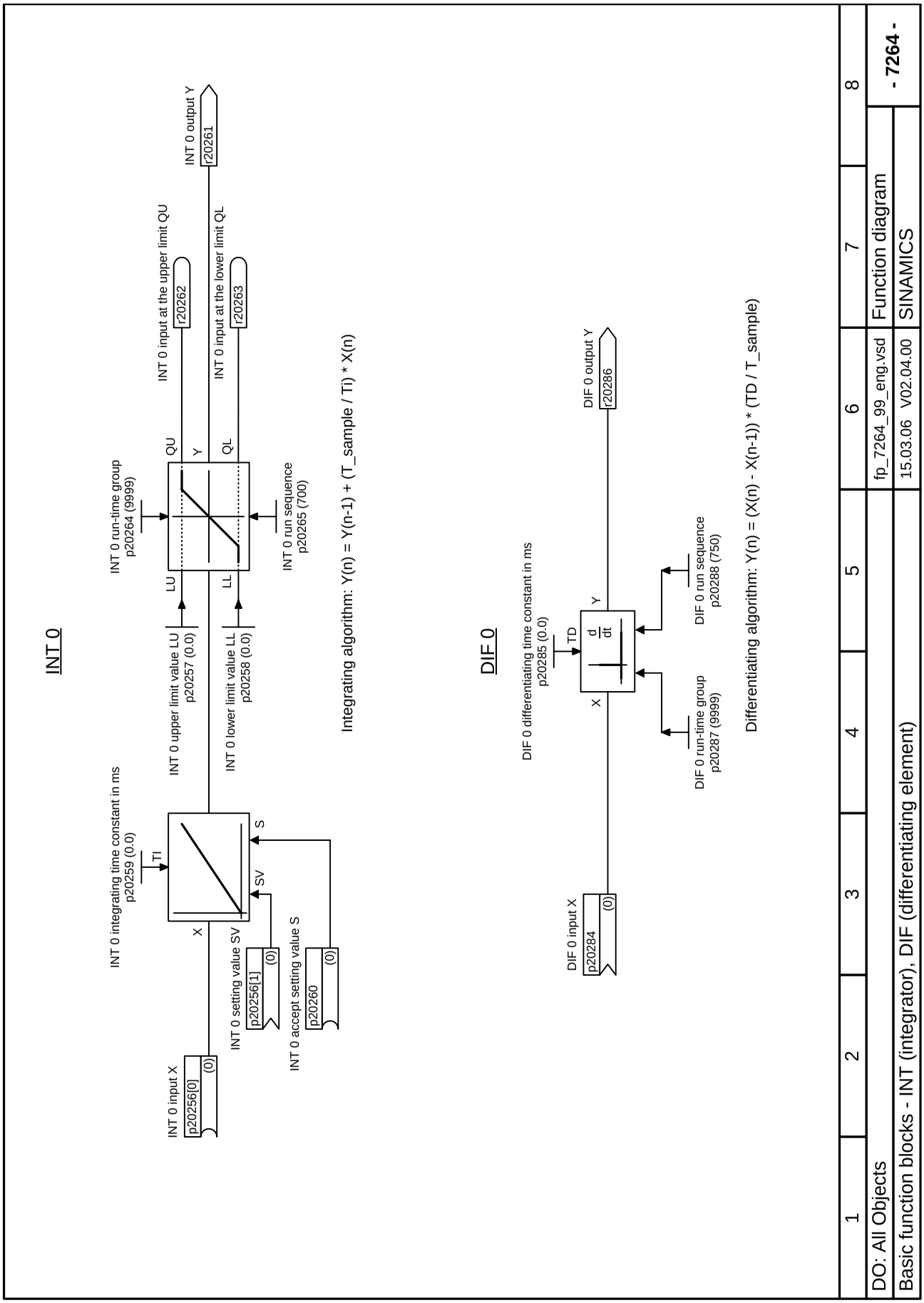

Fig. 3-16 7264 – INT (integrator), DIF (derivative-action element)

3.9 Complex function blocks

Function diagrams

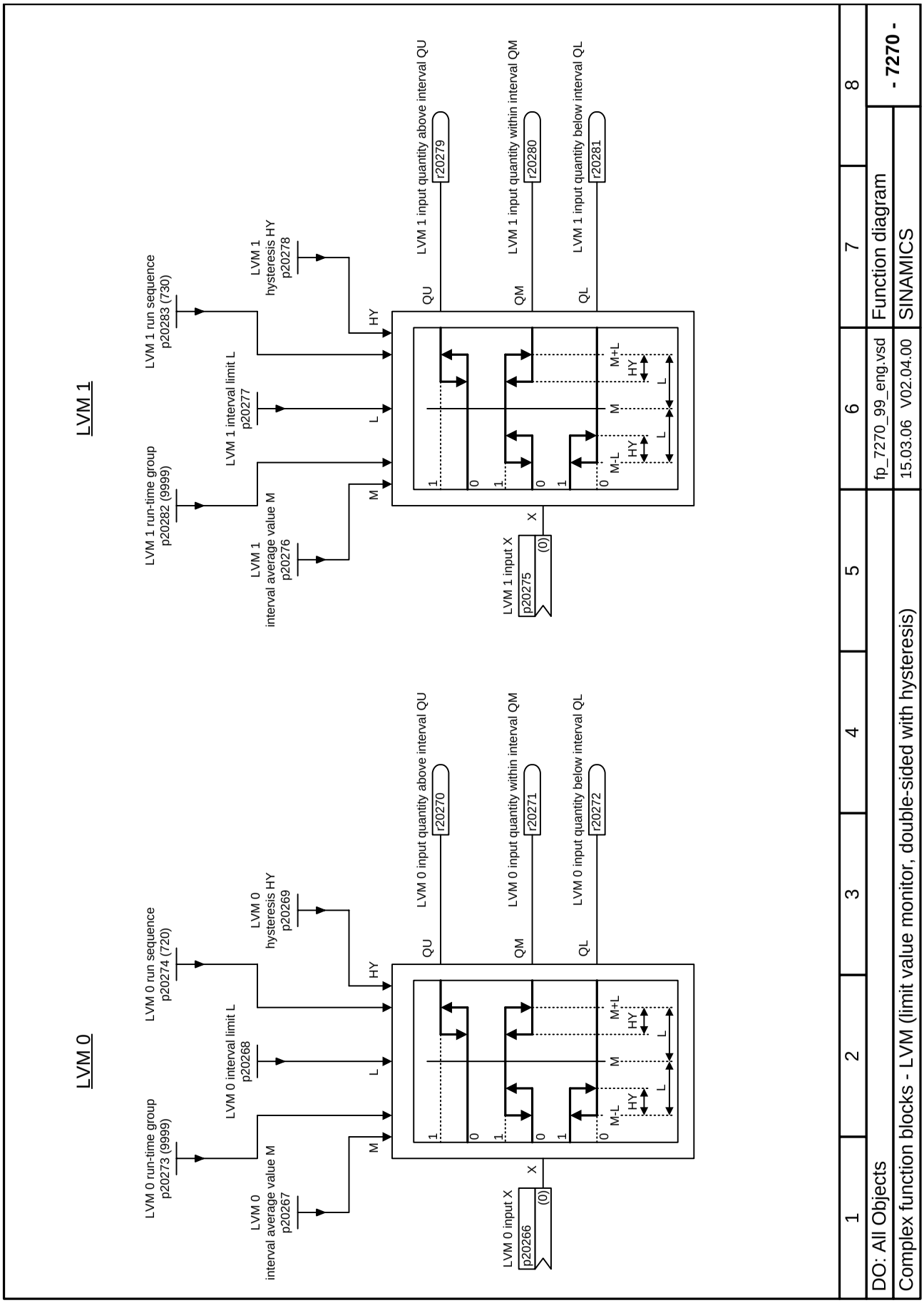

Fig. 3-17 7270 – LVM (double-sided limit monitor with hysteresis)

Faults and Alarms

4

Content

4.1 Overview of the faults and alarms

4.1.1 General information about faults and alarms

Display of faults/alarms

If a fault occurs, the drive displays the relevant fault(s) and/or alarm(s).

The following methods for displaying faults and alarms are available:

- Display via the fault and alarm buffer with PROFIBUS.
- Display online via the commissioning software.

Differences between faults and alarms

The differences between faults and alarms are as follows:

Table 4-1 Differences between faults and alarms

Type	Description
Faults	What happens when a fault occurs? • The appropriate fault reaction is triggered. • Status signal ZSW1.3 is set. • The fault is entered in the fault buffer. How are faults corrected? • Correct the cause of the fault. • Acknowledge the fault.
Alarms	What happens when an alarm occurs? • Status signal ZSW1.7 is set. • The alarm is entered in the alarm buffer. How are alarms corrected? • Alarms are self-acknowledging. They are reset automatically when the cause is no longer present.

Fault reactions

The following fault reactions are defined:

Table 4-2 Fault reactions

List	PROFI-drive	Reaction	Description
NONE	-	None	No reaction when a fault occurs.
OFF1	ON/ OFF	Brake along the ramp-function generator deceleration ramp followed by pulse disable	**Closed-loop speed control (p1300 = 20, 21)** • n_set = 0 is set immediately to brake the drive along the ramp-function generator deceleration ramp (p1121). • When standstill is detected, the motor holding brake (if parameterized) is closed (p1215). The pulses are suppressed when the closing time (p1217) expires. Standstill is detected if the actual speed value drops below the speed threshold (p1226) or if the monitoring time (p1227) started when speed setpoint <= speed threshold (p1226) has expired. **Closed-loop torque control (p1300 = 23)** • The following applies for closed-loop torque control: Reaction as for OFF2. • On switchover to closed-loop torque control via p1501, the following applies: No separate braking reaction. If the actual speed value drops below the speed threshold (p1226) or the timer (p1227) has expired, the motor holding brake (if parameterized) is closed. The pulses are suppressed when the closing time (p1217) expires.
OFF2	COAST STOP	Internal/external pulse disable	**Closed-loop speed and torque control** • Immediate pulse suppression, the drive "coasts" to a standstill. • The motor holding brake (if parameterized) is closed immediately. • The switch-on inhibit is activated.

Table 4-2 Fault reactions, continued

List	PROFI-drive	Reaction	Description
OFF3	QUICK STOP	Brake along the OFF3 deceleration ramp followed by pulse disable	**Closed-loop speed control (p1300 = 20, 21)** • n_set = 0 is set immediately to brake the drive along the OFF3 deceleration ramp (p1135). • When standstill is detected, the motor holding brake (if parameterized) is closed. The pulses are suppressed when the holding brake closing time (p1217) expires. Standstill is detected if the actual speed value drops below the speed threshold (p1226) or if the monitoring time (p1227) started when speed setpoint <= speed threshold (p1226) has expired. • The switch-on inhibit is activated. **Closed-loop torque control (p1300 = 23)** • Switchover to speed-controlled operation and other reactions as described for speed-controlled operation.
STOP1	-	-	In preparation
STOP2	-	n_set = 0	• n_set = 0 is set immediately to brake the drive along the OFF3 deceleration ramp (p1135). • The drive remains in closed-loop speed control.
DCBRAKE	-	-	In preparation
ENCODER	-	Internal/external pulse disable (p0491)	The fault reaction ENCODER is applied depending on the setting in p0491. Factory setting: p0491 = 0 --> Encoder fault causes OFF2

Acknowledgement of faults

The list of faults and alarms specifies how to acknowledge each fault after the cause has been corrected.

Table 4-3 Acknowledgement of faults

Acknowledgment	Description
POWER ON	The fault is acknowledged via POWER ON (switch drive unit off and on again). **Note:** If this action has not corrected the fault cause, the fault is displayed again immediately after power up.
IMMEDIATELY	Faults can be acknowledged on an individual drive object (points 1 to 3) or on all drive objects (point 4) via the following options: 1 Acknowledge by setting parameter: p3981 = 0 --> 1 2 Acknowledge via binector inputs: p2103 BI: 1. Acknowledge faults p2104 BI: 2. Acknowledge faults p2105 BI: 3. Acknowledge faults 3 Acknowledge using PROFIBUS control signal: STW1.7 = 0 --> 1 (edge) 4 Acknowledge all faults p2102 BI: Acknowledge all faults This binector input can be used to acknowledge all faults on all drive objects of the drive system. **Note:** • These faults can also be acknowledged via POWER ON. • If this action has not eliminated the fault cause, the fault is displayed again immediately after power up. • Safety Integrated faults The "Safe standstill" (SH) function must be deselected before these faults are acknowledged.
PULSE DISABLE	The fault can only be acknowledged during pulse disable (r0899.11 = 0). The same options are available as for the IMMEDIATELY acknowledgment.

Saving fault buffer when switching off

The contents of the fault buffer are saved as non-volatile memory when the Control Unit 320 (CU320) is switched off, i.e. the fault buffer history is still available when the unit is switched on again.

Note:

Requirements:

- Firmware with version V2.2 or higher.
- Control Unit 320 (CU320) with hardware version C or higher.
  The hardware version is shown on the type plate or can be displayed online with the commissioning software (in project navigator under "Drive Unit" --> Configuration --> Version Overview).

If these requirements are not fulfilled, the contents of the fault buffer are deleted on every POWER ON.

The fault buffer of a drive object comprises the following parameters:

- r0945[0...63], r0947[0...63], r0948[0...63], r0949[0...63]
- r2109[0...63], r2130[0...63], r2133[0...63], r2136[0...63]

The fault buffer contents can be deleted manually as follows:

- Delete fault buffer for all drive objects:
  p2147 = 1 --> p2147 = 0 is automatically set after execution.
- Delete fault buffer for a specific drive object:
  p0952 = 0 --> The parameter belongs to the specified drive object.

The fault buffer contents are automatically deleted in response to the following events:

- Restore factory setting (p0009 = 30 and p0976 = 1).
- Download with modified structure (e.g. number of drive objects changed).
- Power up after other parameter values have been loaded (e.g. p0976 = 10).
- Firmware version upgrade.

4.1.2 Explanations for the list of faults and alarms

The data in the following example has been chosen at random. A description can contain the information listed below. Some of the information is optional.

The list of faults and alarms (see Section 4.2) has the following layout:

- Start of example -

Axxxxx (F, N)	**Fault location (optional): Name**
Reaction:	NONE
Acknowledg-ment:	NONE
Cause:	Description of possible causes. Fault value (r0949, interpret format): or alarm value (r2124, interpret format): (optional) Information about fault or alarm values (optional).
Remedy:	Description of possible remedies.
Reaction to F:	A_INFEED: OFF2 (OFF1, NONE) SERVO: NONE (OFF1, OFF2, OFF3) VECTOR: NONE (OFF1, OFF2, OFF3)
Acknowledge-ment for F:	IMMEDIATELY (POWER ON)
Reaction to N:	NONE
Acknowledge-ment for N:	NONE

- End of example -

Axxxxx	**Alarm xxxxx**
Axxxxx (F, N)	**Alarm xxxxx (message type can be changed to F or N)**
Fxxxxx	**Fault xxxxx**
Fxxxxx (A, N)	**Fault xxxxx (message type can be changed to A or N)**
Nxxxxx	**No message**
Nxxxxx (A)	**No message (message type can be changed to A)**
Cxxxxx	**Safety message (separate message buffer)**

A message comprises a letter followed by the relevant number.

The meaning of the letters is as follows:

- A means "Alarm"
- F means "Fault"
- N means "No report" or "Internal report"
- C means "Safety message"

The optional parenthesis indicates whether the type specified for this message can be changed and which message types can be adjusted via parameters (p2118, p2119).

Information about reaction and acknowledgement are specified independently for a message with adjustable message type (e.g. reaction to F, acknowledgement for F).

Note:

You can change the default properties of a fault or alarm via the parameterization.

References: /IH1/ SINAMICS S120 Installation and Start-Up Manual "Diagnostics" section

The list of faults and alarms (see Section 4.2) provides information with respect to the properties of a message set as standard. If the properties of a certain message are changed, the relevant information in this list may have to be changed.

Fault location (optional): Name

The fault location (optional), the name of the fault or alarm and the message number all serve to identify the message (e.g. with the commissioning software).

Reaction: Default fault reaction (adjustable fault reaction)

Specifies the default reaction in the event of a fault.

The optional parenthesis indicates whether the default fault reaction can be changed and which fault reactions can be adjusted via parameters (p2100, p2101).

Note:

See Section 4.1.1

Acknowledgment: Default acknowledgement (adjustable acknowledgement)

Specifies the default method of fault acknowledgement after the cause has been eliminated.

The optional parenthesis indicates whether the default acknowledgement can be changed and which acknowledgement can be adjusted via parameters (p2126, p2127).

Note:

See Section 4.1.1

Cause:

Description of the possible causes of the fault/alarm. A fault or alarm value is also specified as an option.

Fault value (r0949, format):

The fault value is entered in the fault buffer in r0949[0...63] and specifies additional, precise information about a fault.

Alarm value (r2124, format):

The alarm value specifies additional, precise information about an alarm.

The alarm value is entered in the alarm buffer in r2124[0...7] and specifies additional, precise information about an alarm.

Remedy:

Description of the possible procedures for correcting the cause of the pending fault or alarm.

Alarm

In individual cases, the service and maintenance personnel are responsible for choosing a suitable procedure for correcting the cause of faults.

4.2 List of faults and alarms

Product: SINAMICS OA Freeblocks, Version: 2402300, Language: eng

F50510 Log-on of the run-time group for sampling time management rejected

Reaction: NONE

Acknowledge: IMMEDIATELY

Cause: When the run-time groups of the free function blocks attempted to log-on with the internal interface of the sampling time management, the log-on was rejected.

Remedy: The function module - free function blocks - must be again de-activated (p0108[].18 = 0) on the drive object on which the free function blocks were last activated (p0108[].18 = 1). The assignment of drive object numbers to the index numbers of the p0108[] can be read-out in p0101[] and to the drive object types in p0107[] to the drive object of the CU or CX (only with SM150).
Carry-out a POWER ON.

F50511 Memory no longer available for free function blocks

Reaction: NONE

Acknowledge: IMMEDIATELY

Cause: When the free function blocks were activated, the available memory area for these applications on the Control Unit was exceeded.

Remedy: The function module - free function blocks - must be again de-activated (p0108[DO].18 = 0) on the drive object on which the free function blocks were last activated (p0108[DO].18 = 1).
Carry-out a POWER ON.

A50512 Limit for available computation time reached

Reaction: NONE

Acknowledge: NONE

Cause: The recommended limits for the computation time utilization were exceeded. For the free function blocks, it is not permissible that additional function blocks or run-time groups are activated and it is also not permissible that the sampling time of the run-time groups is further shortened.
Alarm value (r2124, decimal):
Bit 0 = 1:
The limit of 90% of the average computation time utilization (r9976[1]) was exceeded.
Bit 1 = 1:
The computation time utilization in the cycle time slices has exceeded 90%.
Also refer to: p9976

Remedy: Reduce the number of activated function blocks, increase the sampling times for the run-time groups used, de-activate function modules on the active drive objects, reduce the number of drive objects.

A50513 (F) Run sequence value was already assigned

Reaction: NONE

Acknowledge: NONE

Cause: A attempt was made to assign a run sequence value already assigned to a function block on this drive object to another additional function block on the same drive object. A run sequence value can only be precisely assigned to one function block on one drive object.
Alarm value (r2124, decimal):
Least significant word:
Parameter number that rejected the run sequence value.
Most significant word:
Parameter number that already has the run sequence value.

Remedy: Set another value for the run sequence that up until now has still not be used on this drive object.

Reaction upon F: NONE

Acknowledge upon F: IMMEDIATELY

A50514 Sampling time of the fixed run-time group differs

Reaction: NONE

Acknowledge: NONE

Cause: The sampling time of a system block was set to a lower value (p0112, p0115) as the smallest permissible sampling time that is permissible for the fixed run-time group belonging to this system block (1 ms). The fixed run-time group involved is assigned as a minimum to one block.
Alarm value (r2124, decimal):
Number of the run-time group (corresponds to the index of p20000) where the sampling time does not correspond to the sampling time of the associated system block.

Remedy: Using parameter p0112 or p0115, increase the sampling time of the system block to the minimum permissible sampling time for the run-time groups of 1 ms or change the sampling time assignment of this run-time group.

List of Abbreviations

A

Abbreviation	English
O	
A...	Alarm
AC	Alternating Current
ADC	Analog Digital Converter
AI	Analog Input
ALM	Active Line Module
AO	Analog Output
AOP	Advanced Operator Panel
ASC	Armature Short-Circuit
ASCII	American Standard Code for Information Interchange
ASM	Induction motor
B	
BB	Operating condition
BERO	Trade name for a type of proximity switch
BI	Binector Input
BIA	Berufsgenossenschaftliches Institut für Arbeitssicherheit (German Institute for Occupational Safety)
BICO	Binector Connector Technology
BLM	Basic Line Module
BOP	Basic Operator Panel
C	
C	Capacitance
C...	Safety message
CAN	Controller Area Network
CBC	Communication Board CAN
CD	Compact Disc
CDS	Command Data Set
CI	Connector Input
CNC	Computer Numerical Control
CO	Connector Output
CO/BO	Connector Output/Binector Output

Abbreviation	English
COB-ID	CAN object identification
COM	Common contact of a change-over relay
CP	Communications Processor
CPU	Central Processing Unit
CRC	Cyclic Redundancy Check
CSM	Control Supply Module
CU	Control Unit
D	
DAC	Digital Analog Converter
DC	Direct Current
DCN	Direct Current Negative
DCP	Direct Current Positive
DDS	Drive Data Set
DI	Digital Input
DI/DO	Bidirectional Digital Input/Output
DMC	DRIVE-CLiQ Module Cabinet (Hub)
DO	Digital Output
DO	Drive Object
DPRAM	Dual-Port Random Access Memory
DRAM	Dynamic Random Access Memory
DRIVE-CLiQ	Drive Component Link with IQ
DSC	Dynamic Servo Control
E	
EDS	Encoder Data Set
EGB	Electrostatic Sensitive Devices
ELP	Earth Leakage Protection
EMC	Electromagnetic Force
EMC	Electromagnetic Compatibility
EN	European Standard
EnDat	Encoder-Data-Interface
EP	Enable Pulses
EPOS	Basic positioner
ES	Engineering System
ESB	Equivalent circuit diagram
ESR	Extended Stop and Retract
F	
F...	Fault
FAQ	Frequently Asked Questions
FCC	Function Control Chart
FCC	Flux Current Control
FEM	Separately excited synchronous motor

Abbreviation	English
FEPROM	Flash-EPROM
FG	Function Generator
FI	Earth Leakage Circuit-Breaker (ELCB)
FP	Function diagram
FW	Firmware
G	
GB	Gigabyte
GC	Global Control Telegram (Broadcast Telegram)
GSD	Device master file: describes the features of a PROFIBUS slave
GSV	Gate Supply Voltage
H	
HF	High Frequency
HFD	High frequency reactor
HLG	Ramp-function generator
HMI	Human Machine Interface
HTL	High-Threshold Logic
HW	Hardware
I	
i. V.	In preparation: this feature is currently not available
IBN	Commissioning
I/O	Input/Output
ID	Identifier
IEC	International Electrotechnical Commission
IGBT	Insulated Gate Bipolar Transistor
IL	Pulse suppression
IT	Insulated three-phase supply network
IVP	Internal Voltage Protection
J	
JOG	Jogging
K	
KDV	Data cross-checking
KIP	Kinetic buffering
Kp	Proportional gain
KTY	Special temperature sensor
L	
L	Inductance
LED	Light Emitting Diode
LIN	Linear motor

Abbreviation	English
LR	Position controller
LSB	Least Significant Bit
LSS	Line Side Switch
LU	Lenght Unit
M	
M	Reference potential, zero potential
MB	Megabyte
MCC	Motion Control Chart
MDS	Motor Data Set
MLFB	Machine-readable product designation
MMC	Man Machine Communication
MSB	Most Significant Bit
MSCY_C1	Master Slave Cycle Class 1
MT	Measuring probe
N	
N. C.	Not Connected
N...	No Report
NAMUR	Standardization association for measurement and control in chemical industries
NC	Normally Closed (contact)
NC	Numerical Control
NEMA	National Electrical Manufacturers Association
NM	Zero Mark
NO	Normally Open (contact)
O	
OA	Open Architecture
OEM	Original Equipment Manufacturer
OLP	Optical Link Plug
OMI	Option Module Interface
P	
p...	Adjustable parameter
PcCtrl	Master Control
PDS	Power Module Data Set
PE	Protective Earth
PELV	Protective Extra Low Voltage
PEM	Permanent-magnet synchronous motor
PG	Programming device
PI	Proportional Integral
PID	Proportional Integral Differential

Abbreviation	English
PLC	Programmable Logic Controller
PLL	Phase Locked Loop
PNO	PROFIBUS user organisation
PPI	Point to Point Interface
PRBS	Pseudo Random Binary Signal
PROFIBUS	Process Field Bus
PS	Power Supply
PTC	Positive Temperature Coefficient
PTP	Point To Point
PWM	Pulse Width Modulation
PZD	PROFIBUS process data
Q	
R	
r...	Display parameter (read only)
RAM	Random Access Memory
RCCB	Residual Current Circuit Breaker
RCD	Residual Current Device
RJ45	Standard. Describes an 8-pole plug connector with twisted pair Ethernet.
RKA	Recooling system
RO	Read Only
RPDO	Receive Process Data Object
RS232	Serial interface
RS485	Standard. Describes the physical characteristics of a digital serial interface.
RTC	Real Time Clock
S	
S1	Continuous operation
S3	Periodic duty
SBC	Safe Brake Control
SBH	Safe operating stop
SBR	Safe braking ramp
SBT	Safe Brake Test
SCA	Safe Cam
SDI	Safe Direction
SE	Safe software limit switch
SG	Safely reduced speed
SGA	Safety-related output
SGE	Safety-related input
SH	Safe standstill
SI	Safety Integrated
SIL	Safety Integrity Level
SLI	Safely Limited Increment

Abbreviation	English
SLM	Smart Line Module
SLP	Safely Limited Position
SLS	Safely Limited Speed
SLVC	Sensorless Vector Control
SM	Sensor Module
SMC	Sensor Module Cabinet
SME	Sensor Module External
SN	Safe software cam
SOS	Safe Operational Stop
SPC	Setpoint Channel
SPS	Programmable Logic Controller (PLC)
SS1	Safe Stop 1
SS2	Safe Stop 2
SSI	Synchronous Serial Interface
SSM	Safe Speed Monitoring n < nx
SSR	Safe Stop Ramp
STO	Safe Torque Off
STW	PROFIBUS control word
T	
TB	Terminal Board
TIA	Totally Integrated Automation
TM	Terminal Module
TN	Grounded three-phase supply network
Tn	Integral time
TPDO	Transmit Process Data Object
TT	Grounded three-phase supply network
TTL	Transistor-Transistor-Logic
U	
UL	Underwriters Laboratories Inc.
UPS	Uninterruptible Power Supply
V	
VC	Vector Control
Vdc	DC link voltage
VdcN	Partial DC link voltage negative
VdcP	Partial DC link voltage positive
VDE	Association of German Electrical Engineers
VDI	Association of German Engineers
Vpp	Volt peak to peak
VSM	Voltage Sensing Module

Abbreviation	English
W	
WEA	Automatic restart
WZM	Machine tool
X	
XML	Extensible Markup Language
Y	
Z	
ZK	DC link
ZSW	PROFIBUS status word

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