Softstarters

Type PSE
Fieldbus communication
CANopen for PSE, fw rev. 01.01.00 and 01.01.02

1SFC132069M0201
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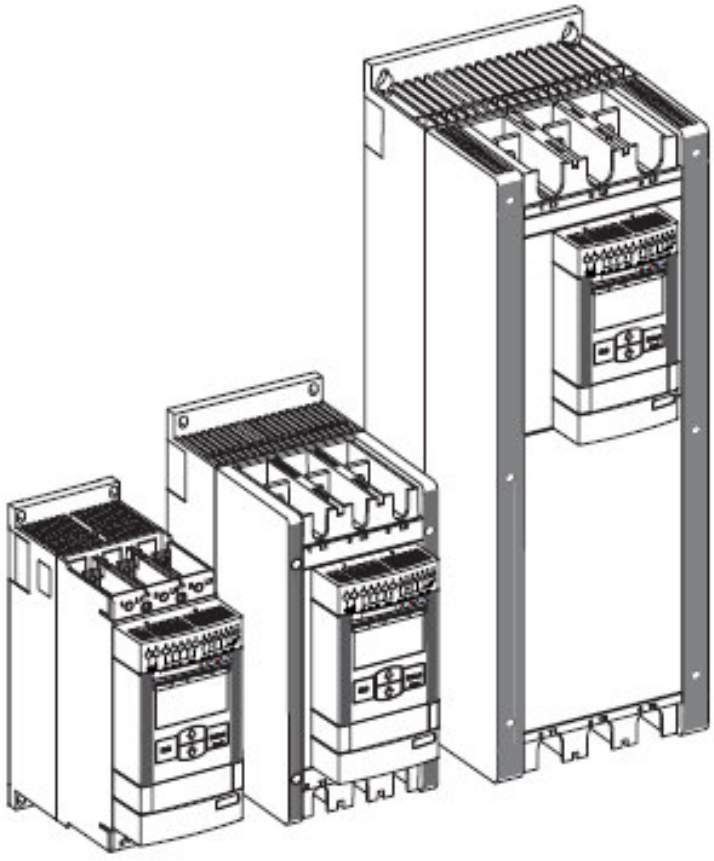

CANopen

The CANopen protocol is a fieldbus protocol that provides full control and status information of the softstarter as well as reading and writing of parameters. Through the fieldbus it is possible to start and stop the motor, read out currents and frequency, achieve information about protections, warnings, faults and much more.
See chapter 8 in the Installation and commissioning manual, document 1SFC132057M0201, for fieldbus related settings available.

Before the CANopen fieldbus can be taken in operation following parameters must be set in the softstarter:
- Parameter *FB Enable* set to On
- Parameter *FB Address* set to a free communication address

For technical data and descriptions of the CANopen COP21-FBP fieldbus plug, see document 2CDC194002D0201 available at www.abb.com/lowvoltage .

To do the programming of the PLC, use the following EDS file:

FBP_CO_PSE.eds

Caution!

The motor may start unexpectedly if there is a start signal present when doing any of the actions listed below.

- ***Switching from one type of control to another (fieldbus control/hardwire control)***
- ***Reset all Settings***

Binary input telegram
To PLC from Softstarter.

Word in input data area	Binary input byte	Bit	Data	Description
0	**0**	**0**	Reserved	
		1	Stop	Motor stopped status
		2	Run	Motor run status
		3	Reserved	
		4	Reserved	
		5	Auto mode *)	0 = Local control, 1 = PLC control
		6	Fault	Fault status
		7	Reserved	
	1	**8 (0)**	Reserved	
		9 (1)	DI_FBP_Trip	State of Trip input on FBP
		10 (2)	DI_FBP_Local	State of Local/Remote input on FBP
		11 (3)	DI_Start	Start input signal state
		12 (4)	DI_Stop	Stop input signal state
		13 (5)	DI_Reset	Reset input signal state
		14 (6)	TOR	Top of ramp (internal by-pass relays closed)
		15 (7)	Ready to start	0 = A start will probably cause a fault, 1 = A start will probably not cause a fault

*) Auto mode reflects the control state of the softstarter. This is affected by the input signals from the PLC (binary output telegram) and the state of the Local/Remote switch on the Fieldbus Plug Accessory.

Analog input telegram
To PLC from Softstarter.
All analogue data will be represented as 16 bit values.

Word in input data area	Analogue input word	Data	Representation
1	**0**	Motor current in % of Ie (0%-800%)	Value = 1 ⇒ 1 %
2	**1**	Thermal load in % of trip temp (0%-100%)	Value = 1 ⇒ 1 %
3	**2**	Phase current L1 *)	Value = 1 ⇒ 1 A
4	**3**	Phase current L2 *)	Value = 1 ⇒ 1 A
5	**4**	Phase current L3 *)	Value = 1 ⇒ 1 A
6	**5**	Max phase current *)	Value = 1 ⇒ 1 A
7	**6**	Measured frequency	Value = 1 ⇒ 1 Hz
8	**7**	Measured CosPhi	Value = 100 ⇒ 1
9	**8**	Output voltage in % of max voltage	Value = 1 ⇒ 1 %
10	**9**	Counted # of starts	Value = 1 ⇒ 100
11	**10**	Run time	Value = 1 ⇒ 10 hours

*) Phase current L1, L2 and L3 indicates the current through the softstarter while the Max phase current always is the line current.

Diagnostic inputs
The fieldbus related diagnostic message is composed of a bit map of all potential faults and protections, as well as a flag, which indicates if the active fault or protection can be reset.

If ‘Parameter is read-only’, ‘Parameter not settable in current state’ or ‘Parameter out of range’ bits are set, ‘Fault code’ contains the parameter number. ‘Parameter not settable in current state’ can occur if the motor is running. If ‘Extended diagnosis is available’ is set, ‘Fault code’ contains the Event information for the current event. For events that can occur on a specific line, e.g., Phase loss, the value of the fault code will indicate the line number the event occurred on. A ‘4’ indicates the line cannot be determined or the problem exists on all three phases.

Word in input data area	Word	Byte	Bit	Data
12	0	0	0	Reset possible on active event
			1	Software fault
			2	Shunt fault
			3	By-pass open (by-pass does not close)
			4	Softstarter overload
			5	Phase loss
			6	Bad network quality
			7	Current lost
		1	8 (0)	Fieldbus fault
			9 (1)	Low supply voltage
			10 (2)	High current
			11 (3)	Motor overload
			12 (4)	Locked rotor protection
			13 (5)	Underload protection
			14 (6)	Spare
			15 (7)	Spare
13	1	2	16 (0)	Spare
			17 (1)	Spare
			18 (2)	Spare
			19 (3)	Spare
			20 (4)	Spare
			21 (5)	Spare
			22 (6)	Spare
			23 (7)	Spare
		3	24 (0)	Spare
			25 (1)	Spare
			26 (2)	Spare
			27 (3)	Spare
			28 (4)	Spare
			29 (5)	Spare
			30 (6)	Spare
			31 (7)	Spare
14	2	4	32 (0)	Spare
			33 (1)	Spare
			34 (2)	Spare
			35 (3)	Spare
			36 (4)	Spare
			37 (5)	Spare
			38 (6)	Spare
			39 (7)	Spare
		5	40 (0)	Spare
			41 (1)	Spare
			42 (2)	Spare
			43 (3)	Spare
			44 (4)	Spare
			45 (5)	Spare
			46 (6)	Spare
			47 (7)	Spare
15	3	6	48 (0)	Spare
			49 (1)	Spare
			50 (2)	Spare

Word in input data area	Word	Byte	Bit	Data
			51 (3)	Spare
			52 (4)	Parameter is read-only
			53 (5)	Parameter not settable in the current state
			54 (6)	Parameter value is out of range
			55 (7)	Extended diagnosis is available
		7	Fault code	

Binary output telegram
From PLC to Softstarter.

Word in output data area	Binary output byte	Bit	Data	Description
0	**0**	**0**	Reserved	
		1	Stop	Commence a stop when signal is set - needs to be cleared for a start to be possible
		2	Start	Commence a start when signal is set
		3	Reserved	
		4	Reserved	
		5	Auto mode *)	0 = Local control – PLC hands over control to local inputs, 1 = Auto mode – PLC controls the softstarter
		6	Fault reset	Reset signal for possible events
		7	Reserved	
	1	**8 (0)**	Reserved	
		9 (1)	Reserved	
		10 (2)	Reserved	
		11 (3)	Reserved	
		12 (4)	Reset active diagnostics	Clears the active diagnostics in the Fieldbus Plug
		13 (5)	Spare	
		14 (6)	Spare	
		15 (7)	Spare	
1	**2**	**8 (0)**	Spare	
		9 (1)	Spare	
		10 (2)	Spare	
		11 (3)	Spare	
		12 (4)	Spare	
		13 (5)	Spare	
		14 (6)	Spare	
		15 (7)	Spare	
	3	**8 (0)**	Reserved	
		9 (1)	Reserved	
		10 (2)	Reserved	
		11 (3)	Reserved	
		12 (4)	Reserved	
		13 (5)	Reserved	
		14 (6)	Reserved	
		15 (7)	Reserved	

*) This signal is used by the PLC to hand over control to local inputs. This signal needs to be held at logic ‘1’ for the PLC to be controlling the softstarer.

Analog output telegram
The PSE does not have an analog output telegram

Input address map

	15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	Binary In, Byte 1								Binary In, Byte 0							
1	Analogue In, Word 0															
2	Analogue In, Word 1															
3	Analogue In, Word 2															
4	Analogue In, Word 3															
5	Analogue In, Word 4															
6	Analogue In, Word 5															
7	Analogue In, Word 6															
8	Analogue In, Word 7															
9	Analogue In, Word 8															
10	Analogue In, Word 9															
11	Analogue In, Word 10															
12	Diagn. Byte 1								Diagn. Byte 0							
13	Diagn. Byte 3								Diagn. Byte 2							
14	Diagn. Byte 5								Diagn. Byte 4							
15	Diagn. Byte 7, Fault code								Diagn. Byte 6							

Output address map

	15	**14**	**13**	**12**	**11**	**10**	**9**	**8**	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
0	Binary Out, Byte 1								Binary Out, Byte 0							
1	Binary Out, Byte 3								Binary Out, Byte 2							
2	Binary Out, Byte 5								Binary Out, Byte 4							
3	Binary Out, Byte 7								Binary Out, Byte 6							

Parameters
For this implementation all parameter values (both binary and analogue) are represented as 32 bits.

Parameter	Type	Parameter	Description	Range	Unit
1	Read/Write	Setting Ie	Motor rated current	0 – 3700 = 0.0f – 370.0f *)	A
2	Read/Write	Start Ramp	Start ramp time	1 – 30	s
3	Read/Write	Stop R On	Stop ramp on	0 = Off, 1 = On	
4	Read/Write	Stop Ramp	Stop ramp time	1 – 30	s
5	Read/Write	Init Volt	Initial voltage	30 – 70	%
6	Read/Write	End Volt	End voltage	30 – 70	%
7	Read/Write	Curr Lim	Current limit	15 – 70 = 1.5f – 7.0f	xIe
8	Read/Write	Trq Start	Torque control start	0 = Off, 1 = On	
9	Read/Write	Trq Stop	Torque control stop	0 = Off, 1 = On	
10	Read/Write	Kick Start	Kick start on	0 = Off, 1 = On	
11	Read/Write	Kick Time	Kick start time	1 – 10 = 0.1f – 1.0f	s
12	Read/Write	Kick Volt	Kick start voltage	30 – 100	%
13	Read/Write	EOL On	EOL on	0 = Off, 1 = On	
14	Read/Write	EOL Class	EOL class	0 = 10A, 1 = 10, 2 = 20, 3 = 30	EOL class
15	Read/Write	EOL Op	EOL reset type	0 = Hand, 1 = Auto	
16	Read/Write	Underload	Underload prot on	0 = Off, 1 = On	
17	Read/Write	Underl Lev	Underload level	2 – 10 = 0.2f – 1.0f	A
18	Read/Write	Underl Op	Underload reset type	0 = Hand, 1 = Auto	
19	Read/Write	Locked R	Locked rotor prot on	0 = Off, 1 = On	
20	Read/Write	Lock R Lev	Locked rotor level	5 – 70 = 0.5f – 7.0f	A
21	Read/Write	Lock R Time	Locked rot reset type	0 = Hand, 1 = Auto	
22	Read/Write	Bad Net Op	Bad network reset type	0 = Hand, 1 = Auto	
23	Read	FB Enable	Fieldbus control enabled	0 = Off, 1 = On	
24	Read	FB Address	Fieldbus address	0 – 255	
25	Read	FB Par DL	Fieldbus download parameter	0 = dPOff , 1 = dPOn	
26	Read	FB Auto Dis	Fieldbus fault reaction	0 = Trip, 1 = Local	
27	Read	FB Op	Fieldbus reset type	0 = Hand, 1 = Auto	

*) The softstarter in itself will have a much more narrow range defined by its rated current and only values within the range of the softstarter will be accepted.

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