



SM15K - Interface modules



Models	Description
INT MOD ANA	Isolated Analog interface
INT MOD ANY	Anybus-carrier interface
INT MOD CON	Isolated Contacts interface
INT MOD DIG	Digital I/O interface
INT MOD M/S 2	Master/Slave interface
INT MOD SER	Multi-protocol Serial interface

General Features

- Plug-and-play modules for the SM15K series power supplies
- Multiple interfaces possible per power supply
- Isolated from the output voltage
Working voltage 1000 V or 1500 V depending on type of unit
- Floating with respect to earth

Features INT MOD ANA

Analog programming interface

- High accuracy, low drift
- 16 bit AD and DA conversion
- Compatible with other Delta Elektronika 15p analog interfaces
- Factory calibrated for optimum accuracy

Features INT MOD ANY

Anybus-carrier interface

- Compatible with a variety of HMS Anybus CompactCom 40 inserts
- Web based configuration
- High speed programming and monitoring

Features INT MOD CON

Isolated contacts

- 4 relays with make-and-break contacts
- Additional (floating) Interlock with 24V enable system
- Programmable via Ethernet

Features INT MOD DIG

Digital (user) I/O

- 8 inputs Logic high = 2.5 ... 30V, Logic low = 0V
- 8 Open Drain outputs 0 - 30V, max. 200mA
- Programmable via Ethernet or sequences

Features INT MOD M/S-2

Master/Slave interface SM15K

- Easy control of series or parallel operation.
- Multiple power supplies behave as one power supply.
- Large systems, up to 900 kW

Features INT MOD SER

Serial programming interface SM15K

- Multi-protocol: RS232, RS485, RS422, USB
- Web based configuration
- Speeds up to 115.2 kbps

SM15K Interfaces Combinations

Most of the interface types can be combined with others. There are some limitations.

	INT MOD ANA	INT MOD ANY	INT MOD CON	INT MOD DIG	INT MOD M/S-2	INT MOD SER
INT MOD ANA						
INT MOD ANY						
INT MOD CON						
INT MOD DIG						
INT MOD M/S-2						
INT MOD SER						



Combination allowed



Multiple interfaces of this type allowed



Combination not allowed

For the total amount per type and the allowed slots, please check the information on the corresponding interface page in this document, under "Mounting".

Isolated Analog Interface - INT MOD ANA

Typical Applications

- Analog programming of voltage and current
- Analog monitoring of voltage and current
- Remote monitoring of the status signals: OverTemp, Limit
- Remote Shut down of the power output using a 5V signal



Specifications

Analog Programming		CV	CC
Programming inputs			
Input range		0 - 5 / 0 - 10 V	0 - 5 / 0 - 10 V ¹
Accuracy		± 0.2 %	± 0.2 %
Offset		- 1 ... + 1 mV (on 5 V)	- 1 ... + 1 mV (on 5 V)
Temp. coeff. offset		10 µV / °C	10 µV / °C
Input impedance		10 MΩ	10 MΩ
Monitoring output			
Output range		0 - 5 / 0 - 10 V	- 5 to + 5 V / - 10 to + 10 V
Accuracy		± 0.2 %	± 0.2 %
Offset		- 1 ... + 1 mV (on 5 V)	- 1 ... + 1 mV (on 5 V)
Temp. coeff. Offset		3 µV / °C	60 µV / °C
Output impedance		2 Ω / max. 4 mA	2 Ω / max. 4 mA
Reference voltage			
On prog. connector	V _{ref} TC	5.114 V ± 15 mV (R _o = 2 Ω, max. 4 mA) 20 ppm	
+12 V output			
on prog. Connector	V _o I _{max} R _o	12 V ± 0.2 V 0.2 A 5 Ω	
Status outputs			
CC - status		CC - operation	5 V = logic 1 (R _o = 500 Ω)
LIM - status		CV or CC limit	5 V = logic 1 (R _o = 500 Ω)
OT - status		Over Temperature	5 V = logic 1 (R _o = 500 Ω)
ACF - status		AC - Fail	5 V = logic 1 (R _o = 500 Ω)
DCF - status		DC - Fail ²	5 V = logic 1 (R _o = 500 Ω)
Remote Shutdown		with +5 V, 1 mA or relay contact	
Insulation			
Prog.connector - internal circuits		1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 with the exception of 1500 VDC for SM1500-CP-30	
Prog.connector - earth		Max. 60 VDC	
Safety		EN 60950 / EN 61010	
Operating Temperature		-20 to +50 °C	
Humidity		Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C	
Storage temperature		-40 to +70 °C	
Mounting³		Pluggable, SM15K interface slots 1, 2, 3 and slot 4.	
Programming connector		15 pole D-connector (female)	
Compatibility		Cannot be combined with INT MOD ANY.	
Weight		140 g	

¹ CC-prog input (pin3) sets both CC+ and CC- with 1 signal.

² V_{out} ±5% beyond set point

³ Max 1pc INT MOD ANA per unit.

Anybus carrier - INT MOD ANY

Typical Applications

- Carrier interface for HMS Networks Anybus® CompactCom M40 inserts
- Connecting the power supply to existing industrial fieldbus network
- Programming of voltage, current and power
- Monitoring of voltage, current and power
- Remote monitoring of the status signals: ACF, DCF, Interlock, and more
- Remote shutdown of the power output



Supported Anybus inserts

Interface between Power Supply and Industrial Field Buses via AnyBus CompactCom 40 insert:

- CANopen (AB6613)
- EtherCAT (AB6607)
- Ethernet/IP (AB6604)
- Modbus-TCP (AB6603)
- PROFIBUS (AB6600)
- PROFINET (AB6605)

Note: Both an INT MOD ANY and a CompactCom M40 insert are required to connect a power supply to one of the above fieldbuses.

Specifications

Maximum Programming/Monitoring processing time^{4,5}	
Ethernet/IP	< 500 µs
EtherCAT	< 150 µs
Modbus-TCP	< 300 µs
CANopen	< 300 µs
PROFIBUS	t.b.d.
PROFINET-IRT	t.b.d.
Status update time	< 1ms
Insulation	
Prog.connectors - internal circuits	1000 VDC Reinforced isolation acc. EN61010-1 with the exception of 1500 VDC for SM1500-CP-30.
Prog.connectors - earth	Max. 60 VDC
Safety	EN 61010
Operating Temperature	-20 to +50 °C
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
Storage temperature	-40 to +70 °C
Mounting⁶	Pluggable, SM15K interface slots 1, 2, 3 or slot 4.
Compatibility	Cannot be combined with INT MOD ANA.
Weight	140 g ⁷

⁴ Excluding network latency and Power Supply response times

⁵ Measured using 16-bit Data Format A.

⁶ Max 1pc INT MOD ANY per unit.

⁷ Excluding AnyBus CompactCom 40 insert.

Isolated Contacts - INT MOD CON

Typical Applications

- Trigger an external safety alarm
- Interact in automated processes
- Switch the output On/Off with a remote 24Vdc signal
- Using a floating signal for triggering the Interlock function



Specifications

Relay contacts 1... 4	
Contact voltage	60 V
Contact current	2 A
Maximum switching capacity	60 W
Floating Interlock	
Open circuit voltage	5 V
Floating Enable	
Nominal input voltage	24 VDC
Input voltage range	15 - 30 VDC
Input impedance	12 kΩ
Insulation	
Prog.connectors - internal circuits	1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 with the exception of 1500 VDC for SM1500-CP-30
Prog.connectors - earth	Max. 60 VDC
Safety	EN 60950 / EN 61010
Operating Temperature	-20 to +50 °C
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
Storage temperature	-40 to +70 °C
Mounting	Pluggable, SM15K interface slots 1, 2, 3 and slot 4.
Programming connector	Relay 1 & 2, via a 6 pole "FK-MC 0,5/ 6-ST-2,5" connector. Relay 3 & 4, via a 6 pole "FK-MC 0,5/ 6-ST-2,5" connector. Interlock and Enable via a 3 pole "FK-MC 0,5/ 3-ST-2,5" connector. Contra connectors supplied with interface.
Weight	140 g

Digital User I/O - INT MOD DIG

Typical Applications

- Hardware triggering of sequences
- Interaction with other equipment
- Stand-alone automation
- Safety or Alarm indications



Specifications

Logic inputs 1... 8 Input range Input impedance Load current +5V	2 – 30 V $R_{in} = 22 \text{ k}\Omega$ 100 mA
Logic outputs 1 ... 8 Output type Output impedance	Open Drain (True = 0V, False = open) 7 Ω (max 30V/200mA)
Insulation Prog.connectors - internal circuits Prog.connectors - earth	1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 with the exception of 1500 VDC for SM1500-CP-30 Max. 60 VDC
Safety	EN 60950 / EN 61010
Operating Temperature	–20 to +50 °C
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
Storage temperature	–40 to +70 °C
Mounting	Pluggable, SM15K interface slots 1, 2, 3 and slot 4.
Programming connector	User Outputs via 15 pole D-connector High Density (female), User Inputs via 15 pole D-connector High Density (female).
Weight	140 g

Master Slave Interface - INT MOD M/S-2

Typical Applications

- Applications where more current or voltage is required than one power supply can deliver
- Applications where a symmetrical power supply is needed



Specifications

	SM70-CP-450	SM210-CP-150	SM500-CP-90	SM1000-CP-45	SM1500-CP-30
M/S Parallel operation Max. number of devices ⁸ Ripple + noise Programming Speed Additional programming time ⁹ Programming cable Max. cable length	60 units Values of a single unit 2 x the values of a single unit 20 µs Modular connector cable S/FTP CAT6 8P8C 2 m				
Recovery time	3x the values of a single unit		2x the values of a single unit		
M/S Series operation Max. voltage Max. number of devices ⁸ Additional programming time ⁹ Programming cable Max. cable length	Not possible		750 V ¹⁰ 1000 V ¹¹ 6 units 20 µs Modular connector cable S/FTP CAT6 8P8C 2 m	Not possible	
Safety	EN 60950 / EN 61010				
Operating Temperature	-20 to +50 °C				
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C				
Storage temperature	-40 to +70 °C				
Mounting ¹²	Pluggable, SM15K interface slot 3 or slot 4. See paragraph 'Hardware Installation' in the operating manual.				
Weight	70 g				

⁸ For M/S setups, only use units of the same type

⁹ Typical

¹⁰ Units delivered before Q4 / 2018. Contact factory for upgrading to enable 1000V series operation for older units

¹¹ Units from Q4 / 2018 or newer

¹² Max 1pc INT MOD M/S-2 per unit.

Serial Interface (multi-protocol) - INT MOD SER

Typical Applications

- RS232 Programming
- Balanced RS422 Programming
- USB Programming
- Balanced RS485 Bi-directional Programming



Specifications

Communication speeds (bps)	2400, 4800, 9600, 19200, 38400, 57600, 115200
Insulation Prog.connectors - internal circuits	1000 VDC Reinforced isolation acc. EN60950-1 / EN61010-1 with the exception of 1500 VDC for SM1500-CP-30
Prog.connectors - earth	Max. 60 VDC
Safety	EN 60950 / EN 61010
Operating Temperature	−20 to +50 °C
Humidity	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
Storage temperature	−40 to +70 °C
Mounting	Pluggable, SM15K interface slots 1, 2, 3 and slot 4.
Programming connector	RS422 & RS485 wires via a 4 pole FK-MC 0,5/ 4-ST-2,5 connector (contra header supplied) RS232 via 9 pole D-connector (female), USB socket type B.
Weight	140 g