



## 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 (SM15K)
INT MOD SER	Multi-protocol Serial interface

### General Features

- Plug and Play for the SM15K series power supplies
- Multiple interfaces possible per power supply
- Isolated from the output voltage  
Working voltage 1000V or 1500V 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 modules
- 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 900kW

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

<sup>1</sup> CC-prog input (pin3) sets both CC+ and CC- with 1 signal.

<sup>2</sup> V<sub>out</sub> ±5% beyond set point

<sup>3</sup> Max 1pc INT MOD ANA per unit.

## Anybus carrier - INT MOD ANY

### Typical Applications

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



### Supported Anybus modules

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

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

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

### Specifications

<b>Maximum Programming/Monitoring processing time<sup>4,5</sup></b>	
Ethernet/IP	< 500 µs
EtherCAT	< 150 µs
Modbus-TCP	< 300 µs
CANopen	< 300 µs
PROFIBUS	t.b.d.
PROFINET-IRT	t.b.d.
<b>Status update time</b>	< 1ms
<b>Insulation</b>	
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
<b>Safety</b>	EN 61010
<b>Operating Temperature</b>	-20 to +50 °C
<b>Humidity</b>	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
<b>Storage temperature</b>	-40 to +70 °C
<b>Mounting<sup>6</sup></b>	Pluggable, SM15K interface slots 1, 2, 3 or slot 4.
<b>Compatibility</b>	Cannot be combined with INT MOD ANA.
<b>Weight</b>	140 g <sup>7</sup>

<sup>4</sup> Excluding network latency and Power Supply response times

<sup>5</sup> Measured using 16-bit Data Format A.

<sup>6</sup> Max 1pc INT MOD ANY per unit.

<sup>7</sup> Excluding AnyBus CompactCom 40 Module.

## 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

<b>Relay contacts 1... 4</b>	
Contact voltage	60 V
Contact current	2 A
Maximum switching capacity	60 W
<b>Floating Interlock</b>	
Open circuit voltage	5 V
<b>Floating Enable</b>	
Nominal input voltage	24 VDC
Input voltage range	15 - 30 VDC
Input impedance	12 k $\Omega$
<b>Insulation</b>	
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
<b>Safety</b>	EN 60950 / EN 61010
<b>Operating Temperature</b>	-20 to +50 °C
<b>Humidity</b>	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
<b>Storage temperature</b>	-40 to +70 °C
<b>Mounting</b>	Pluggable, SM15K interface slots 1, 2, 3 and slot 4.
<b>Programming connector</b>	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.
<b>Weight</b>	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

<b>Logic inputs 1... 8</b> Input range Input impedance Load current +5V	2 – 30 V $R_{in} = 22 \text{ k}\Omega$ 100 mA
<b>Logic outputs 1 ... 8</b> Output type Output impedance	Open Drain (True = 0V, False = open) 7 $\Omega$ (max 30V/200mA)
<b>Insulation</b> 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
<b>Safety</b>	EN 60950 / EN 61010
<b>Operating Temperature</b>	-20 to +50 °C
<b>Humidity</b>	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
<b>Storage temperature</b>	-40 to +70 °C
<b>Mounting</b>	Pluggable, SM15K interface slots 1, 2, 3 and slot 4.
<b>Programming connector</b>	User Outputs via 15 pole D-connector High Density (female), User Inputs via 15 pole D-connector High Density (female).
<b>Weight</b>	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
<b>M/S Parallel operation</b> Max. number of devices <sup>8</sup> Ripple + noise Programming Speed Additional programming time <sup>9</sup> 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		
<b>M/S Series operation</b> Max. voltage  Max. number of devices <sup>8</sup> Additional programming time <sup>9</sup> Programming cable  Max. cable length	Not possible		750 V <sup>10</sup> 1000 V <sup>11</sup> 6 units 20 μs Modular connector cable S/FTP CAT6 8P8C 2 m	Not possible	
<b>Safety</b>	EN 60950 / EN 61010				
<b>Operating Temperature</b>	-20 to +50 °C				
<b>Humidity</b>	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C				
<b>Storage temperature</b>	-40 to +70 °C				
<b>Mounting<sup>12</sup></b>	Pluggable, SM15K interface slot 3 or slot 4. See paragraph 'Hardware Installation' in the operating manual.				
<b>Weight</b>	70 g				

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

<sup>9</sup> Typical

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

<sup>11</sup> Units from Q4 / 2018 or newer

<sup>12</sup> 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

<b>Communication speeds</b> (bps)	2400, 4800, 9600, 19200, 38400, 57600, 115200
<b>Insulation</b> 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
<b>Safety</b>	EN 60950 / EN 61010
<b>Operating Temperature</b>	-20 to +50 °C
<b>Humidity</b>	Max. 95% RH, non-condensing, up to 40 °C Max. 75% RH, non-condensing, up to 50 °C
<b>Storage temperature</b>	-40 to +70 °C
<b>Mounting</b>	Pluggable, SM15K interface slots 1, 2, 3 and slot 4.
<b>Programming connector</b>	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.
<b>Weight</b>	140 g