



## SM15K - Interface modules

Models	Description
INT MOD M/S-2	Master/Slave interface SM15K
INT MOD CON	Isolated contacts interface
INT MOD SER	Multi-protocol serial interface
INT MOD DIG	Digital I/O interface
INT MOD ANA	Isolated analog 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 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 CON

#### Isolated contacts

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

### Features INT MOD SER

#### Serial controller interface SM15K

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

### 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 ANA

#### Analog controller interface

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

## SM15K Interfaces Combinations

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

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



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 "Assembly".

## 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>4</sup> Ripple + noise Programming Speed Additional programming time <sup>1</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 2m				
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>4</sup> Additional programming time <sup>1</sup> Programming cable  Max. cable length	Not possible		750V <sup>2</sup> 1000V <sup>3</sup> 6 units 20µs Modular connector cable S/FTP CAT6 8P8C 2m	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 + 85 °C				
<b>Assembly</b>	Pluggable, SM15K interface slot 3 or slot 4. See paragraph 'Hardware Installation' in the operating manual. Note 1: max 1pcs INT MOD M/S-2 per unit.				
<b>Weight</b>	70 g				

<sup>1</sup> Typical

<sup>2</sup> Units delivered before Q4 / 2018. Contact factory for upgrading to enable 1000V series operation for older units

<sup>3</sup> Units from Q4 / 2018 or newer

<sup>4</sup> Note: for M/S setups, only use units of the same type

## 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	12kOhm
<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 + 85 °C
<b>Mounting</b>	Pluggable, SM15K interface slots 1, 2, 3 and slot 4. See paragraph 'Hardware Installation' in the operating manual. Maximum 4pcs per unit.
<b>Programming connector</b>	Relay 1 & 2, via a 6 pole push wire or so-called push in connector. Relay 3 & 4, via a 6 pole push wire / push in connector. Interlock and Enable via a 3 pole push wire / push in connector. For all 3 connectors there's a contra header supplied.
<b>Weight</b>	0.14 kg

## 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 + 85 °C
<b>Mounting</b>	Pluggable, SM15K interface slots 1, 2, 3 and slot 4. See paragraph 'Hardware Installation' in the operating manual. Maximum 4pcs per unit.
<b>Programming connector</b>	RS422 & RS485 wires via push wire or so-called push in connector (contra header supplied) RS232 via 9 pole D-connector (female), USB socket type B.
<b>Weight</b>	0.14 kg

## 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 - 30V $R_{in} = 22k\Omega$ 100mA
<b>Logic outputs 1 ... 8</b> Output type Output impedance	Open Drain (True = 0V, False = open) 7 Ohm (max 30V/200mA)
<b>Insulation</b> 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
<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 + 85 °C
<b>Mounting</b>	Pluggable, SM15K interface slots 1, 2, 3 and slot 4. See paragraph 'Hardware Installation' in the operating manual. Maximum 4pcs per unit.
<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>	0.14 kg

## Isolated Analog Controller 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 *
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 MOhm	10 MOhm
			* CC-prog input (pin3) sets both CC+ and CC- with 1 signal.
<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 Ohm / max. 4 mA	2 Ohm / max. 4 mA
<b>Reference voltage</b>		5.114 ±15 mV (R <sub>o</sub> = 2 Ohm, max. 4 mA)	
on prog. connector	V <sub>ref</sub>	20 ppm	
	TC		
<b>+12 V output</b>		12 V ± 0.2 V	
on prog. Connector	V <sub>o</sub>	0.2 A	
	I <sub>max</sub>	5 Ohm	
	R <sub>o</sub>		
<b>Status outputs</b>			
CC - status		CC - operation	5 V = logic 1 (R <sup>o</sup> = 500 Ohm)
LIM - status		CV or CC limit	5 V = logic 1 (R <sup>o</sup> = 500 Ohm)
OT - status		Over Temperature	5 V = logic 1 (R <sup>o</sup> = 500 Ohm)
ACF - status		AC - Fail	5 V = logic 1 (R <sup>o</sup> = 500 Ohm)
DCF - status		DC - Fail <sup>2)</sup>	5 V = logic 1 (R <sup>o</sup> = 500 Ohm) <sup>2)</sup> V <sub>out</sub> ±5% beyond set point
PSOL - status		Although present on the interface, for SM15K the PSOL-status is not used, it is only for SM3300.	
<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.connectors - internal circuits			
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 + 85 °C	
<b>Mounting</b>		Pluggable, SM15K interface slots 1, 2, 3 and slot 4. See paragraph 'Hardware Installation' in the operating manual. Maximum 1pcs INT MOD ANA per unit.	
<b>Programming connector</b>		15 pole D-connector (female)	
<b>Weight</b>		0.14 kg	