



# PSC-232 module

## PSC-232

### PRODUCT MANUAL

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# Operating manual for power supply controllers



## 1. Features

The PSC is an RS232 interface, designed for an analog programmable power supply. The PSC sets output voltage and current and reads the voltage, current and status. The PSC also controls Remote/Local, Remote Shut Down etc. Up to 15 PSC's can be connected to only one RS232 port. The analog voltages can be calibrated by software. The calibration settings can be saved in non volatile memory and recalled at power on.

## 2. Languages

The PSC allows two groups of commands:

- SCPI
- DPL

For communication with the PSC languages like Basic, Pascal, C, Visual Basic, Delphi, Testpoint or LabView can be used. Some free software examples are available on [www.DeltaPowerSupplies.com](http://www.DeltaPowerSupplies.com). There is an external model for bench, rail or rack mounting and there are PSC card sets to use inside a power supply.

## 3. Models

MODELS	RS232	GPIB	USE
PSC-232 module	•		Bench/rail/rack
PSC-232	•		SM1500/6000 card set
<i>PSC-232 P146</i>			<i>Not Available after 2018.</i>
PSC-232 P148	•		ES150 card set

## 4. Accessories supplied with the PSC

Accessories	PSC-232 module	PSC-232	PSC-232 P146	PSC-232 P148
RS232 cable	•	•	•	•
Analog cable	•			
Line cord	•			
Rail Mounting clip	•			

## 5. Dimensions

PSC-232 module:

89 x 85.5 x 118 mm, 0.8 kg.

Enclosure: IP20

## 6. Specifications

### 6.1 Power:

Range: 98-264 VAC (48-62 Hz), for DC-voltage contact factory.

Power consumption: 10 W

Hold-up time: 300 ms,  $V_{in} = 230$  VAC

80 ms,  $V_{in} = 110$  VAC

### 6.2 EMC:

Emission: EN 61326-1

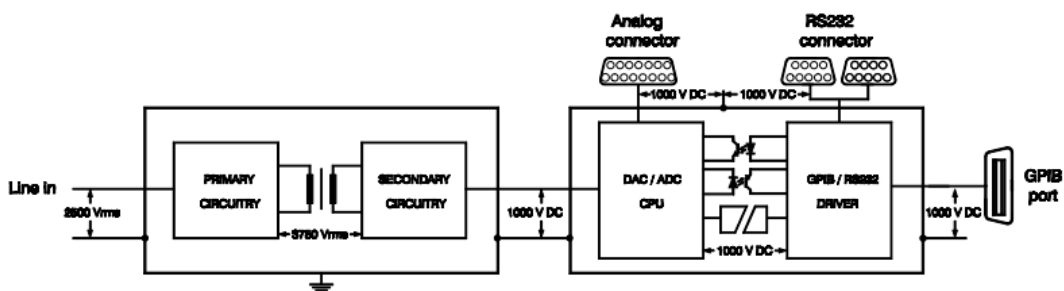
Immunity: EN 61326-1

### 6.3 Isolation:

Analog/logic in/outputs to case: 1000V DC

RS232 to case: 1000V DC

Line input to case: 2500V AC



Isolation schematic diagram

## 6.4 Ambient temperature:

Operating: 0 to 55 °C (ext. model)

Storage: -20 to +40 °C

## 6.5 Analog outputs:

The analog outputs can be individually set on 0-5 V The settings can be reported. Calibration is by software. Settings can be saved in non-volatile memory. Analog in- and outputs have a common zero.

- 2 analog outputs with buffered 14 bit DAC
- Output range 0 to 5 V
- Full scale software adjustment > 200 mV
- Offset software adjustment > 200 mV
- Resolution 0.33 mV / 5 V output
- Linearity error 1 LSB
- TC typical 30 ppm / °C

## 6.6 Analog inputs:

The analog inputs can be individually read. Calibration is done by software. Settings can be saved in non-volatile memory. Analog in- and outputs have a common zero.

- Full scale software adjustment
- 2 x analog input channels with 16 bit, ADC Input range 0 to 5 V
- Offset software adjustment
- Resolution 0.1 mV / 5 V input
- Linearity error +/- 2 LSB
- TC typical 5 ppm / °C

### Read Back Resolution

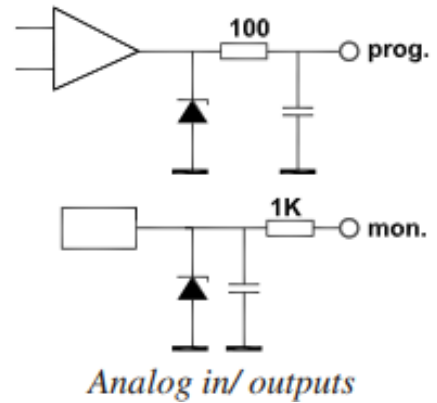
The read back resolution depends on the voltage and current range of the power supply that is used with the PSC.

Range	Decimals
0 - 5.9999	4
6.000 - 59.999	3
60.000 - 599.99	2

### Example with power supply SM52-30:

The voltage range is 52 V. After programming the unit to 50 V, the read back value has 3 decimals, see table;  $V_{\text{readback}} = 50.000$  V. The 3 digits after the decimal point give a resolution of 1 mV. This means that for 50 V the number of steps is 50000. From the next table it can be seen that the resolution is better than 15 bit.

Bit	Steps
12	4096
13	8192
14	16384
15	32768
16	65536



### 6.7 Status monitoring:

The PSC provides TTL /CMOS compatible status inputs for monitoring signal changes and fail signals of the power-supply as CC mode, Current or Voltage Limit, DC Fail, AC Fail and Over Temperature. See power supply manual.

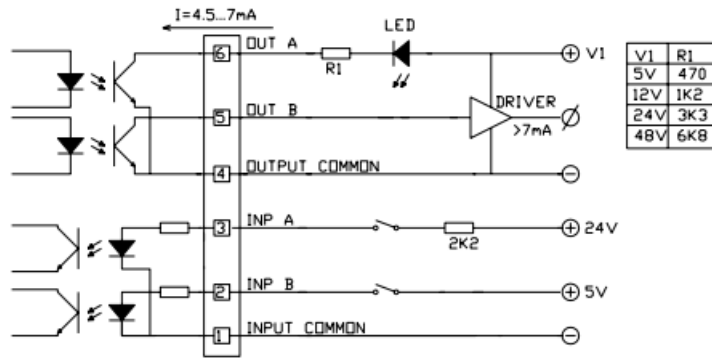
Status	Weight	Name
1	1	CC
2	2	LIM
3	4	DCF
4	8	ACF
5	16	OT
6	32	PSO
7	64	InpA
8	128	InpB

### 6.8 Logic inputs:

The PSC-232 module provide two 1000 V opto isolated logic inputs, InpA and InpB for custom use. The inputs are 470 ohm, Logic high = 2.5 ... 8 V (15 mA max), Logic low = 0 V. The two inputs have a common zero. The maximum reverse voltage = 6 V.

### 6.9 Logic outputs:

The PSC-232 module also provide two opto isolated logic outputs for custom use: OutA and OutB. The opto coupler outputs have an open collector and a common zero. The maximum voltage is 50 V and the maximum current is 5 mA. Total power dissipation = 150 mW.



User logic in/outputs for external PSC-232 module

## 6.10 Led indicator:

The PSC-232 module has LEDs on the front panel.

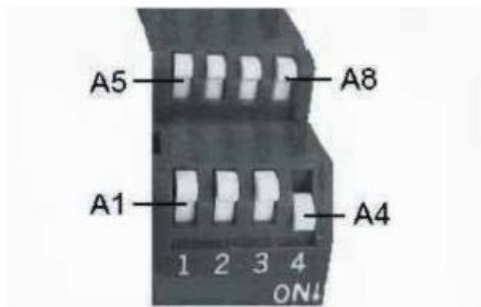
PWR-led = Power on

RDY-led = Device ready for command

## 7. Switch settings

### 7.1 Adress switch:

When setting the address use any address from 1 up to 30. The address is a 5 bit binary number which can be set with switch A1 to A5. Switch A1 is the LSB and switch A5 is the MSB. For example address 1 is 00001 (A1 = on, A2-A5 = off) and address 30 is 11110 (A1 = off, A2-A5 = on).



Address switch

### 7.2 RS232 communication switch:

A6 is used on PSC-488 models only. When the RS232 switch is ON, the PSC is in RS232 mode. The switch OFF means the PSC is in GPIB mode.

### 7.3 Baudrate:

For PSC-232 models the switches A7 and A8 are baudrate switches.

Baudrate	A8	A7
2400	off	off
4800	off	on
9600	on	off
19200	on	on

## 7.4 Factory pre-settings:

### PSC-232:

Channel 1

SCPI Language

9600 baud

A2, A3, A4, A5, A6, A7 = off

A1 and A8 = on

## 8. Connections

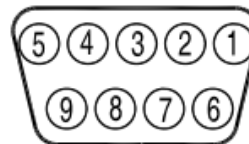
### 8.1 RS232 Interface:

Connector from PC:  
D 9 F conn.

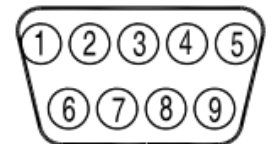
Pin 2 TXD  
Pin 3 RXD  
Pin 5 GND

Connector to next PSC:  
D 9 M conn.

Pin 2 RXD  
Pin 3 TXD  
Pin 5 GND



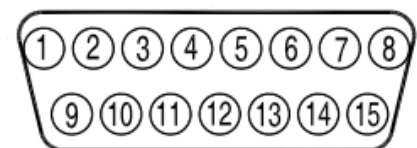
*9F Pole D connector*



*9M Pole D connector*

For connection to the PC or to the next PSC use a 1:1 cable with 1 female and 1 male connector.  
Do not use a null modem cable.

Baudrate : 2400 - 9600 baud  
Databits : 8  
Stopbits : 1  
Paritybits : none  
Signal level : -10 V to +10 V  
Maximum cable length : 15 m

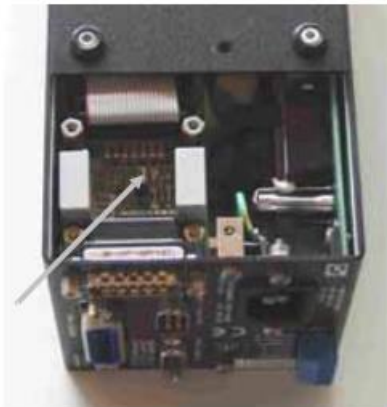


*15 pole D connector*

### 8.2 Pin assignment of the 15P connector:

PIN	DESCRIPTION	PSC In/Output	Abbreviation
1	Analog common	Analog common	AGND
2	Current Monitor	Analog Input	I MON
3	Current Programming	Analog Output	I PROG
4	Constant Current status	Digital Input	CC
5	Remote Shut Down logic output	Digital Output	RSD
6	Power sink overload	Digital Input	PSO 1)2)
7	Not Connected		NC
8	Digital common	Digital common	DGND
9	Not Connected		NC
10	Voltage Monitor	Analog Input	V MON
11	Voltage Programming	Analog Output	V PROG
12	Over Temperature	Digital Input	O.T. 1)
13	Limit Status	Digital Input	LIM 1)
14	DC Fail	Digital Input	DCF 1)
15	AC Fail	Digital Input	ACF 1)

- 1) Check the power supply manual if the power supply supports the status.
- 2) If an SM7020-D or SM3004-D is used in combination with a PSC module, remove the jumper on P532 or otherwise the autoranging will not work properly. First remove the screws from the bottom and top of the PSC in order to remove the cover from the cabinet. Then remove the jumper on the PCB P532.



## 9. Conventions

- Angle brackets < >      Indicate that words or characters enclosed in angular brackets symbolize a program code parameter.
- Brackets {    }      Brackets indicate one of the several parameters may be entered. For example { 1|0|ON|OFF}.
- Square brackets [   ]      All items between square brackets are optional.
- Boldface**      Boldface and computer font is used to show command syntax in the text.
- Controller**      A computer used to communicate with an instrument.



## 9.1 Frequently used ASCII symbols:

Symbols	DEC	HEX	Codes Display	Description
EOT	4	04	\04	end of transmission
LF	10	0A	\n	line feed (command terminator)
CR	13	0D	\r	carriage return
ESC	27	1B	\1B	escape
WSP	32	20	\s	space

## 9.2 Summary of Data types:

	Example	NDEC	Decimal
Digit	character 0...9		8
Hexadecimal	character 0..9 & A...F	#hFA	250
Binary	character 0 or 1	#b0101	5
String	character 0...9 and A...Z		

NDEC = Non-decimal HEX, OCT, BIN (Hexadecimal, Octal, Binary)

## 9.3 Booleans:

A Boolean parameter is normally used to specify a binary condition which is either True or False. Booleans can have one of the following values:

ON or 1 means condition is True.

OFF or 0 means condition is False.

Example: OUTputA ON or OUTputA 1.

## 9.4 Numerical data formats:

Symbol	Meaning	example
<NR1>	Signed integer value	1234
<NR2>	Floating point value without an exponent	12.345

## 10. Installation of the PSC

When the External PSC module is used for the first time, it must be configured and calibrated together with the power supply. The card set types are factory configured and calibrated.

### 10.1 PSC-232 module:

This type PSC is for rail or rack mounting, the unit can be mounted to the rear side of the power supply using a rail. Connect and install the PSC as follows:

- When used with a SM7020-D or with a SM3004-D, remove the link on P532 (see comment 2 on page 8)
- Set the DIP switch to channel (address) 1. A2, A3, A4, A5 = OFF and A1 = ON.
- Set the Baudrate switch to 9600 baud. A6, A7 = OFF and A8 = ON.
- Connect the 15 pole analog cable between the PSC and the power supply.
- Connect the 9 pole RS232 cable between the PC comport and the PSC.
- Connect the line cord.
- Switch the power supply to “programming” (see power supply manual).
- Start the program Cal232.exe (on the CD) and follow the instructions on the screen.

## 10.2 PSC-232, P146 or P148:

These are card sets, mounted inside the power supply. Connect and install the PSC as follows:

- Set the DIP switch to channel 1. A2, A3, A4, A5 = OFF and A1 = ON
- Set the Baudrate switch to 9600 baud. A6, A7 = OFF and A8 = ON
- Connect the 9 pole RS232 cable between the PC comport and the PSC.

## 11. Calibration of the PSC

For easy calibration, a CD with a calibration program is supplied with the PSC-232. You can download the latest version from Internet [www.delta-elektronika.nl](http://www.delta-elektronika.nl)  
First read the “ReadMe” file supplied with the calibration program.

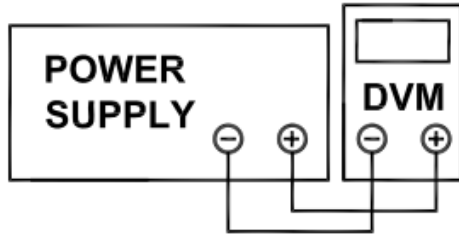
### 11.1 Configuration setting:

- Switch on the power of the power supply.
- Run the LabView program “PSC232\_v61.exe”.
- Select “PSC232 Calibration.vi”.
- Click “OK”.
- Select tab “Start”.
- Select “PSC address” 8.
- Set the “Power supply voltage range”.
- Set the “Power supply current range”.
- When password protected, enable “Reset calibration”.
- Click “run continuously” in menu bar.
- Click “Config”.
- If configuration fails, repeat from configure.
- When configuration is successful, the program. switches automatically to tab 1.

### 11.2 Voltage DAC Offset calibration:

- Connect a digital mV meter to the output terminals of the power supply.
- Click “Continue”. The program sets the current and the voltage. The “Actual offset” will be displayed.
- Enter the DVM value in mV.

- Click “Continue”.
- When calibration fails, repeat.
- When calibration is successful, the program switches automatically to tab 2.



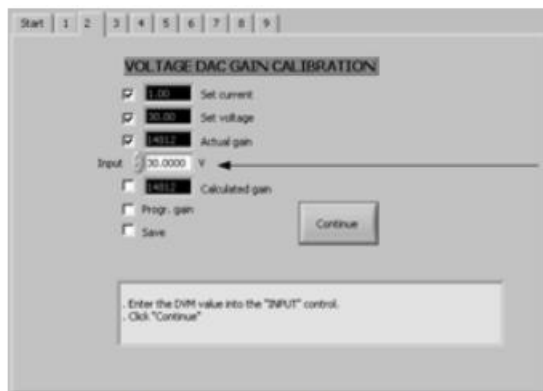
*Voltage calibration connection*



*Screen 1: Voltage DAC Offset calibration*

### 11.3 Voltage DAC gain calibration:

- Switch the digital voltage meter to the right range (maximum output voltage of the power supply).
- Click “Continue”.
- Enter the DVM value.
- Click “Continue”.
- When calibration fails, repeat.
- When calibration is successful, the program switches automatically to tab 3.



*Screen 2: Voltage DAC gain calibration*

### 11.4 Voltage ADC Offset calibration:

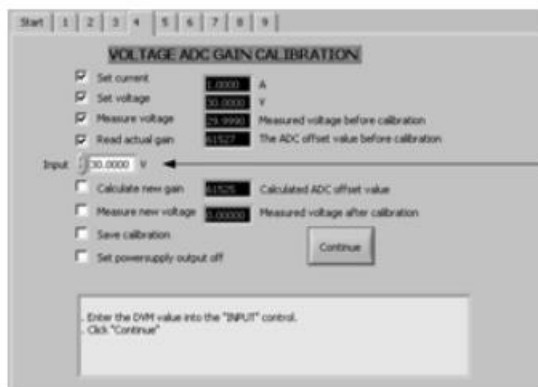
- Switch the digital voltage meter to the right range. See “Set voltage”.
- Click “Continue”.
- Enter the DVM value.
- Click “Continue”.
- When calibration fails, repeat.
- When calibration is successful, the program switches automatically to tab 4.



Screen 3: Voltage ADC offset calibration

### 11.5 Voltage ADC gain calibration:

- Switch the digital voltage meter to the right range (maximum output voltage of the power supply).
- Click "Continue".
- Enter the DVM value into "Input" control.
- Click "Continue".
- Check "Measure new voltage".
- Click "Continue".
- When calibration fails, repeat.
- When calibration is successful, the program switches automatically to tab 5.



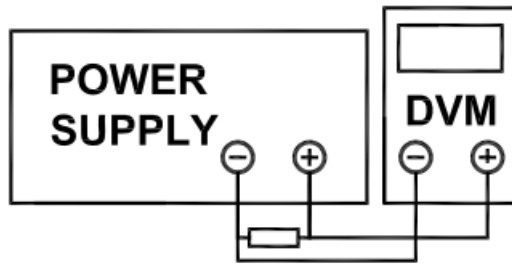
Screen 4: Voltage ADC gain calibration

### 11.6 Current DAC Offset calibration:

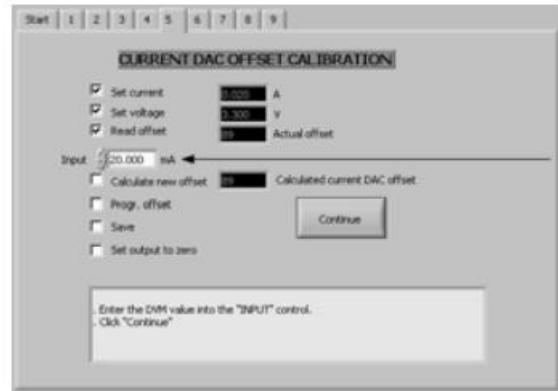
The program has set the voltage and current to zero, so you can safely change the connections of the power supply.

- Connect a shunt and a D.V.M. (or zero flux ampere meter) on the output terminals.
- Click "Continue".
- The program sets the current and the voltage.
- Measure the shunt voltage with the D.V.M. and calculate the current. Enter the value.
- Click "Continue".
- Click "Continue" to set the output to zero.
- When calibration fails, repeat.

- When calibration is successful, the program switches automatically to tab 6.



*Current calibration connection*

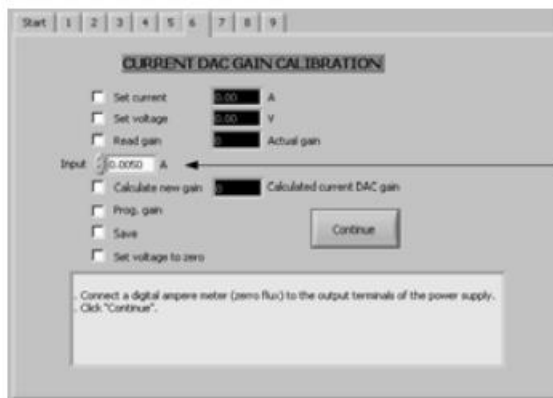


*Screen 5: Current DAC offset calibration*

### 11.7 Current DAC gain calibration:

The program has set the voltage and current to zero, so you can safely change the connections of the power supply.

- Connect a shunt and a D.V.M. (or zero flux ampere meter) on the output terminals.
- Click “Continue”. The program sets the current and the voltage.
- Measure the shunt voltage with the D.V.M. and calculate the current.
- Enter the value.
- Click “Continue”.
- Click "Continue" to set the output to zero.
- When calibration fails, repeat.
- When calibration is successful, the program switches automatically to tab 7.



*Screen 6: Current DAC gain calibration*

### 11.8 Current ADC offset calibration:

- Switch the digital ampere meter to the right range. See “Set current”.
- Click “Continue”.
- Enter the DVM value.
- Click “Continue”.
- Click "Continue" to set the output to zero.
- When calibration fails, repeat.

- When calibration is successful, the program switches automatically to tab 8.



Screen 7: Current ADC offset calibration

### 11.9 Current ADC gain calibration:

- Switch the digital ampere meter to the right range. See “Set current”.
- Click “Continue”.
- Enter the DVM value.
- Click “Continue”.
- Check “Measure new current”.
- Click “Continue”.
- When calibration fails, repeat.
- When calibration is successful, the program switches automatically to tab 9.



Screen 8: Current ADC gain calibration

### 11.10 Change IDN string:

The IDN string can be changed. The suffix of the PSC is entered in field 2. Field 4 is reserved for a custom string. This calibration program enters the calibration date in this field.

- Select a button INT,EXT, P146 or P148. The red characters are the new IDN text.
- Click "Continue".
- Reset the PSC (Switch the power of the PSC off. Wait until all LEDs are off Switch on the PSC power).
- Click "Continue".
- The new IDN string is displayed in the black indicator “New IDN string”.



Screen 9: Change IDN string

End of calibration.

## 12. Power on Settings

When shipped, the PSC-488 module and the PSC-232 module are set to the configuration listed in table. All configurable parameters can be changed and stored by the user.

Function	Command	Value
Voltage range	<b>S</b> ource: <b>V</b> oltage: <b>M</b> aximum	5
Current range	<b>S</b> ource: <b>C</b> urrent: <b>M</b> aximum	5
Text field #2 in IDN string	<b>T</b> ype	"EXT"   "INT"   "P146"   "P148"
Text field #4 in IDN string	<b>C</b> ustom	"Not Calibrate"
Password	<b>P</b> assword	"Default"
Remote shut down		0
Remote		1

At power-on the Service Request Enable Register and the Standard Event Status Enable Register are cleared.

## 13. Languages

This section describes the operation of the two groups of commands. The Groups are: Standard Commands Programmable Instruments SCPI, and Common commands.

- Common commands are mnemonic commands beginning with a star. The query commands are followed by a question mark.
- Standard Commands for Programmable Instruments SCPI. These commands are used to configure and calibrate the PSC, to set voltage and current and to read back voltage, current and status of the Power Supply.

Note: Terminator for all commands is LF.

### 13.1 Common Commands:

The mnemonic common commands have three letters and begin with a star, the query commands are followed by a question mark (?).

The PSC-232 contains the following common commands:

Mnemonics	Description
*IDN?	Identification query.
*RST	Device reset command.
*TST?	Self test query.
*SAV	Save calibration values to non-volatile memory.
*RCL	Recall values from non-volatile memory.

#### \*RST:

The \*RST command resets the device dependent functions except for memorized configuration settings, protected settings and calibration data.

Voltage	0 V
Current	0 A
Output	Disable
RSD	off
REM	on
REM CV	on
REM CC	on
Front panel	Unlock

#### \*TST?:

The Self-Test Query causes the device to execute an internal self-test and reports detected errors.

#### \*SAV:

Saves settings and calibration data in non-volatile memory registers. It is possible to protect the calibration data with a password. Normally the password is "DEFAULT" and not protected. After the command passwordDEFAULT, the new password is active and the \*SAV works only with the password parameter \*SAV .

#### \*RCL:

Recalls the settings and calibration data previously stored with the \*SAV command.

#### \*IDN?:

The Identification Query is used to identify the PSC within a system. The response to the \*IDN? is an which is organized into four fields, mutually separated by commas (2C-hex).



<b>Field 1</b>	<b>Manufacturer</b>	DELTA ELEKTRONIKA BV
<b>Field 2</b>	<b>Model Version</b>	PSC-232 V1.0.0,
<b>Field 3</b>	<b>Serial number</b>	123456789012,
<b>Field 4</b>	<b>Custom string</b>	30 V / 10 A

The maximum number of characters is 72.

### 13.2 SCPI commands:

#### 1. `SOURCE:VOLTage:Maximum`

#### 2. `SOURCE:CURrent:Maximum`

These commands are used to enter the maximum voltage and maximum current range of the used power supply. For example, the Delta power supply model SM35-45 has a range of 35 volt and 45 ampere. The **SOur:VOlt:Max<wsp>35** and the **SOur:CUrr:Max<wsp>45** have to be given before the voltage and current set commands. Save the configuration values in non-volatile memory with the **\*SAV** command. The next time settings will automatically recalled at power on. **SOur:VOlt:MAx?** and **SOur:CUrr:MAx?** read back the voltage and current settings.

#### 3. `CAlibration:CURrent:Offset` `CA:CU:OF<wsp><NR1>`

Used to calibrate the zero-offset of the current programming.

#### 4. `CAlibration:CURrent:OFset?`

Reads-back the present offset calibration value of the current programming.

#### 5. `CAlibration:CURrent:Gain`

Used to calibrate the full-scale of the current programming.

#### 6. `CAlibration:CURrent:GAin?`

Reads-back the present full scale calibration value of the current programming.

#### 7. `CAlibration:VOltage:Offset`

Used to calibrate the zero-offset of the voltage programming.

#### 8. `CAlibration:VOltage:OFset?`

Reads-back the present offset calibration value of the voltage programming.

#### 9. `CAlibration:VOltage:Gain`

Used to calibrate the full-scale of the voltage programming.

#### 10. `CAlibration:VOltage:GAin?`

---

Reads-back the present full-scale calibration value of the voltage programming.

#### 11. `CAlibration:CUrrent:MEasure:Offset`

Used to calibrate the zero-offset of the current monitoring.

#### 12. `CAlibration:CUrrent:MEasure:Offset?`

Reads-back the present offset calibration value of the current monitoring.

#### 13. `CAlibration:CUrrent:MEasure:Gain`

Used to calibrate the full-scale of the current monitoring.

#### 14. `CAlibration:CUrrent:MEasure:GAin?`

Reads-back the present full scale calibration value of the current monitoring.

#### 15. `CAlibration:VOlTage:MEASure:OFFSet`

Used to calibrate the zero-offset of the voltage monitoring.

#### 16. `CAlibration:VOlTage:MEASure:Offset?`

Reads-back the present offset calibration value of the voltage monitoring.

#### 17. `CAlibrate:VOlTage:MEasure:Gain`

Used to calibrate the full-scale of the voltage monitoring.

#### 18. `CAlibrate:VOlTage:MEasure:GAin?`

Reads-back the present full scale calibration value of the voltage monitoring.

#### 19. Password

From factory, the password is set to "DEFAULT" and \*SAV can be used without parameter. With the command `Password<wsp>DEFAULT,<New_password>` the protection is activated. "DEFAULT" is the factory default string, <New\_password> is the new password. The string is maximum 8 characters and is not case sensitive. Execution of the \*SAV command without valid password causes an execution error 15 (Illegal password). A few examples:

#### 20. `PA DEFAULT,MYPASSW<LF>`

Changes the factory default password into a new password. After this command the \*SAV command works only with a valid password as parameter. The command: \*SAV MYPASSW<LF>

#### 21. `PA <current_password>,<new_password>`

Changes the current password into a new password.

---

## 22. PA MYPASS,DEFAULT

Changes the current password into the factory default. Protection is disabled.

## 23. PAssword?

This query returns a 0 if the access is not protected. Otherwise a 1 is returned when the access is protected with a password.

Forgotten password. With the command PAssword:Reset or abbreviated PA:R the PSC coming into a non calibrated state and the password are set to "DEFAULT".

## 24. SORce:FUnction:RSD<wsp><Boolean>

The command SORce:FUnction:RSD<wsp>{ON|1} or abbreviated SO:FU:RSD<wsp>{ON|1} disables the output of the power supply. The command SORce:FUnction:RSD<wsp>{OFF|0} or abbreviated SO:FU:RSD<wsp>{OFF|0} enables the output again.

## 25. SORce:FUnction:RSD?

The query SORce:FUnction:RSD? or abbreviated SO:FU:RSD? returns 1 when the power supply is disabled. Otherwise a 0 is returned.

## 26. SORce:FUnction:OUtA<wsp><Boolean>

The command SORce:FUnction:OUtA<wsp>1 or abbreviated SO:FU:OUA<wsp>1 sets the open collector output A of the PSC to 1.

The command SO:FU:OUA<wsp>0 sets the open collector output A of the PSC to 0.

## 27. SORce:FUnction:OUtA?

The query SORce:FUnction:OUtA? or SO:FU:OUA? returns 0 if the digital output A is set to 0. Otherwise , a 1 is returned.

## 28. SORce:FUnction:OUtB <wsp><Boolean>

The command SORce:FUnction:OUtB<wsp>1 or abbreviated SO:FU:OUB<wsp>1 set the open collector output B of the PSC to 1.

The command SO:FU:OUB<wsp>0 set the open collector output B of the PSC to 0.

## 29. SORce:FUnction:OUtB?

The query SORce:FUnction:OUtB? or SO:FU:OUB? returns 0 if the digital output B is set to 0. Otherwise , a 1 is returned.

## 30. SORce:FUnction:OUTP<wsp>{ON|OFF}

The command SORce:FUnction:OUTP {on|off} or abbreviated SO:FU:OUTP {on|off} enables (on) or disables (off) the output of the power supply.

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### 31. SORce:FUnction:OUTP?

The query SORce:FUnction:OUTP? Or SO:FU:OUTP? Returns 0 when the output is disabled, or 1 when the output is enabled.

### 32. SORce:FUnction:FRontpanel Lock

The command SORce:FUnction:FRontpanel<wsp>{Lock|Unlock} or SO:FU:FR<wsp>{L|U} locks or unlocks the front panel pushbuttons. See the power supply manual for details.

### 33. SORce:FUnction:FRontpanel:Lock?

The query SORce:FUnction:FRontpanel:Lock? Or SO:FU:FR:L? Returns 1 when the front panel is locked. Otherwise a 0 is returned.

### 34. REMote and LOCal

The command REMote switches the power supply to remote-control. The command LOCal switches the power supply back to manual control.

On some power supplies the selection Remote or Local is done by switches on the power supply itself. On these power supplies the commands REMote and LOCal have no effect.

#### REMote?

The query REMote? returns 0 when the power-supply in local mode. and in remote mode, a 1 is returned.

#### LOCal

Warning: After the command LOCal, the power supply will return to the potentiometers settings on the front panel.

Example: If the front-panel voltage potentiometer is set to 35 volt, the power supply output will go to 35V after the command LOCal. Set the potmeters for voltage and current on the front panel to a safe value prior to using the LOCal and REMote commands.

#### REMote:CV

When the programming switch 2 of 'SW A' are set to on, the command REM:CV switches the power supply to voltage remote-control. The command LOC:CV switch the power supply back to manual voltage control.

On some power supplies the selection Remote or Local is done by switches on the power supply itself. On these power supplies the command REMote :CV has no effect.

#### REMote:CV?

The query REM:CV? returns 0 when the power supply in voltage local mode and in voltage remote mode, a 1 is returned.

---

## LOCaI:CV

Warning: After the command **LOC:CV**, the power supply will return to the potentiometer setting on the front panel (Also see the **LOCaI** command).

## REMOte:CC

The command **REM:CC** switches the power supply to current remote-control. The command **LOC:CC** switch the power supply back to manual current control.

On some power supplies the selection Remote or Local is done by switches on the power supply itself. On these power supplies the command **REMOte :CC** has no effect.

## REMOte:CC?

The query **REM:CC?** returns 0 when the power supply in current local mode. and in current remote mode, a 1 is returned.

## LOCaI:CC

Warning: After the command **LOC:CC**, the power supply will return to the potentiometer setting on the front panel. (Also see the **LOCaI** command).

### 35. SOurce:Current <wsp>

This command sets the output current of the power supply. The mode of operation depends upon the load.

### 36. SOurce:CUrrent?

This query returns the present setting of the current.

### 37. SOurce:VOltage <wsp>

This command sets the output voltage of the power supply. The mode of operation depends upon the load.

### 38. SOurce:VOltage?

This query returns the present setting of the voltage.

Note that both voltage and current have to be programmed. It is necessary that the values of both current and voltage are non zero, otherwise the power supply can not function properly. If zero volts is programmed, then the current is limited to zero. If zero current is programmed, then the voltage will not rise!

### 39. MEasure:VOltage?

This query returns the voltage measured at the power supply sense terminals.

### 40. MEasure:CUrrent?

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This query returns the current delivered by the power supply.

Wait for a response from the power supply because it needs time to collect data and send it to the computer.

Note: When you write a program, you have to take care of the timing. The ADC needs some time to measure the voltage or current. See example programs on [www.delta-elektronika.nl](http://www.delta-elektronika.nl)

#### 41. CH

The channel command `CH<wsp>n` is the first command that should be executed to enable the PSC-232xxx type with that channel number. Each unit must have a unique channel number between 0 and 30. The channel can be set with the DIP switch on the front panel of the PSC-232 module or on the back side of an power supply.

#### 42. CH?

The command `CH?` Reads the channel number of the active PSC-232 and communicates this back to the computer.

#### 43. Help?

The query `HELP?` returns a list of PSC commands.

#### 44. SEnse:Digital:DAta?

The Device Status Condition register contains the power supply status and returns a decimal value, which expressed in base 2, reflects the bit values of the register. The returned value is a NR1 response data type. See the power supply manual if the status available.

#### 45. SEnse:Digital:EXtendeddata?

The Device Extended status Condition register contain the power supply status and returns a decimal value, which expressed in base 2, reflects the bit values of the register. The returned value is a NR1 response data type. See the power supply manual if the status available.

#### 46. SEnse:Digital:SWitch?

The Digital switch Condition register contain the power supply DIP switch status and returns a decimal value, which expressed in base 2, reflects the bit values of the register. The returned value is a NR1 response data type. See the power supply manual if the DIP switch status is available.

#### 47. CU

With the CU command you can change the custom string of the identity string. See chapter 14.2.20. The string must have 15 characters including the `<lf>` and is send via RS232. Some examples:

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CU<WSP>CAL. 01-02-2023 Calibration date

CU<WSP>SM 70-20 no 007 Power supply type and inventory number

After this command you can check it with query \*IDN? to display the identify string. With \*SAV you can store the new information in non volatile memory.

## 14. Software examples and programs

Files on the web site:

- Datasheet
- Manual
- RS232 Calibration Program
- Labview VI for PSC-232

### WEEE (Waste Electrical & Electronic Equipment)



Correct Disposal of this Product  
Applicable in the European Union.

This marking shown on the product, its packing or its literature indicates that it should not be disposed with other wastes at the end of its working life, but should be collected separately to recycle it responsibly to promote the sustainable reuse of material resources.