



ELETTRONICA PROFESSIONALE
PROFESSIONAL ELECTRONICS



TPS/D PROTOCOL SCPI

EN

USER MANUAL

**READ AND SAVE
THESE INSTRUCTIONS**

**LEGGI E CONSERVA
QUESTE ISTRUZIONI**

TPS/D Models covered in this manual:

Model	Code
TPS/M/D 1500	99111113
TPS/M/D 3000	99111263
TPS/M/D 6000	99111513
TPS/M/D 9000	99111663
TPS/T/D 10KVA	99116213
TPS/T/D 20KVA	99116313
TPS/T/D 40KVA	99116413
TPS/T/D 60KVA	99116513
TPS/T/D 90KVA	99116713

This manual is written from TPS/T/D firmware version 63 and TPS/M/D firmware version 92.

***Please check the latest manual version at www.elettrotestspa.it
To consult older manual versions, please contact our support at service@elettrotestspa.it***

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1. INTRODUCTION

SCPI (Standard Commands for Programmable Instruments) is a command language for controlling instruments that goes beyond IEEE488.2 to address a wide variety of instruments functions in a standard manner.

The aim of this document is to define the SCPI commands for TPS power supplies.

This manual is written for both single-phase and three-phase generators. For machines that have only the single-phase version, or when using a three-phase machine in single-phase mode, consider only phase R and ignore the parts of this document that concern phases S and T.

1.1. VERSION

This manual is written for the firmware version 92 of the TPS/M/D series and for the firmware version 63 of the TPS/T/D series.

To consult older manual versions, please contact our support at service@elettrotestspa.it

2. SERIAL & LAN PARAMETERS

SERIAL PARAMETERS	
Start	1
Data	8
Parity	None
Stop	1
Baud Rate	1200-9600-19200 Programmable
Timeout	2s*

LAN PARAMETERS	
IP Address	Programmable
IP Address Type	Static
Gateway	Programmable
Subnet Mask	Programmable
Port	502
Operation Mode	Real Com / TCP Server Programmable
Timeout	2s*

3. INTRODUCTION AT SCPI PROGRAMMING

3.1. CONVENTIONS

Symbol	Description	Meaning
< >	Angle Brackets	Items in the angle brackets are parameters that have to be replaced with a value.
	Vertical bar	Vertical bar is used to separate alternative parameters.

3.2. NUMERICAL DATA FORMATS

All data programmed to or returned from TPS are ASCII. The data can be numerical or character string.

Symbol	Description	Esempio
NR1	Number without decimal point	123
NR2	Number with decimal point	12.3

Symbol	Description	Esempio
NR1	Number without decimal point	123
NR2	Number with decimal point	12.3

3.3. CHARACTER DATA FORMAT

Character strings returned by query command take the following form:

Symbol	Description	Meaning
<CRD>	Character Response Data	Character string.

3.4. BASIC DEFINITIONS

3.4.1. Command Tree:

The commands in SCPI protocols are based on a hierarchical structure, also known as command tree.

3.4.2. Program Headers:

Program headers are the keywords that identify the command. They follow the syntax described by SCPI standard.

3.4.3. Common Commands:

Common commands are implemented by all SCPI instruments. The commands with a leading "*" are common commands.

3.4.4. Instrument-Controlled Headers:

Instrument-Controlled headers are used for all other instrument commands. A long form and a short form is possible.

3.4.5. Program Message Terminator:

A program message terminator indicates the end of a program message. For RS-232C, the program message terminator is <NL> (New Line, ASCII hexadecimal code "0A").

3.4.6. Program Header Separator:

If a command has one than more header, the user have to separate them with a colon (:). Data have to be separated from program header by one space.

Example:

FETC:CURR?

VOLT:DC 10

3.4.7. Program Message Unit:

A program message unit is a single command, programming data, or query.

Example:

FREQ?

OUTput ON

4. SUMMARY COMMANDS TABLE

List all the SCPI commands for the TPS/D power supply family.
It also shows if a command is enabled or not for the TPS/M/D or TPS/T/D generators.

TABLE LEGEND:
✓ : Command enabled
✗ : Command disabled

Command	Command Syntax	Query Syntax	Description	TPS/M/D	TPS/T/D
ERROR	-	SYSTem:ERRor ?	The system reply with the last error in the error queue	✓	✓
LOCAL	SYSTem:LOCal	SYSTem:LOCAl ?	Set the power supply in local mode.	✓	✓
REMOTE	SYSTem:REMOte	SYSTem:REMOte?	Set the power supply in remote mode. In this mode it is possible to control the machine from remote.	✓	✓
MONO	SYSTem:CONFigure:NOUTput <NR1>	SYSTem:CONFigure:NOUTput ?	Set and read if the power supply is in single-phase mode or in three-phase mode	✗	✓
AC/DC	SOURce:MODE <CRD>	SOURce:MODE ?	Set the power supply output in AC or DC	✓	✗
RANGE	SOURce:VOLTage:RANGe <NR1>	SOURce:VOLTage:RANGe ?	Set/read the voltage range	✓	✓
SENSE	SOURce:VOLTage:SENSe:SOURce <NR1>	SOURce:VOLTage:SENSe:SOURce ?	Set the output voltage sense (2-wire / 4-wire)	✓	✓
INRUSH	SOURce:CURREnt:INRush <NR1>	SOURce:CURREnt:INRush ?	Set the Continuous/Inrush mode	✗	✓
SYNC	TRIGger:SEQuence:SOURce <CRD>	TRIGger:SEQuence:SOURce ?	Set the SYNC trigger internal or line (Only for machines with Sync option enabled)	✗	✗
OPTIONS	-	SYSTem:OPTions ?	The machine reply with the options installed	✓	✓
RESET	*RST	-	The TPS/D resets	✓	✓
SELECT PHASE	INSTrument:SElect <NR1>	INSTrument:SElect ?	Select the phase in which you want to operate	✗	✓
COUPLE PHASE	INSTrument:COUple <CRD>	INSTrument:COUple ?	Select if you want to operate in all the phases at once (ALL) or select the phase in which operate with command select (NONE)	✗	✓
SET ILIM	SOURce:CURREnt:LEVel:IMMEDIATE:AMPLitude <NR2>	SOURce:CURREnt:LEVel:IMMEDIATE:AMPLitude ?	Set the RMS/PEAK current limit value	✓	✓
ENABLE RMS/PEAK LIM	SOURce:CURREnt:PROtection:STATE <NR1>	SOURce:CURREnt:PROtection:STATE ?	Enables the RMS/PEAK current limit	✓	✓
ILIM DELAY	CURREnt:PROtection:DElay <NR1>	CURREnt:PROtection:DElay ?	Set the RMS limit Delay time	✓	✓
RMS/PEAK LIM	CURREnt:PROtection:TYPE <CRD>	CURREnt:PROtection:TYPE ?	Select RMS or PEAK limit	✓	✓
MEASURE CURRENT (AC)	-	MEASure:SCALar:CURREnt:AC?	The machine reply with the measured output current in AC	✓	✓
MEASURE CURRENT (DC)	-	MEASure:SCALar:CURREnt:DC?	The machine reply with the measured output current in DC	✓	✗
MEASURE VOLTAGE (AC)	-	MEASure:SCALar:VOLTage:AC?	The machine reply with the measured output voltage in AC	✓	✓
MEASURE VOLTAGE (DC)	-	MEASure:SCALar:VOLTage:DC?	The machine reply with the measured output voltage in DC	✓	✗
OUT RELAY	OUTPut:STATe <NR1>	OUTPut:STATe ?	Set the output relay ON or OFF	✓	✓
SET FREQUENCY	SOURce:FREquency:IMMEDIATE <NR2>	SOURce:FREquency:IMMEDIATE ?	Set the output frequency	✓	✓
SET FREQUENCY SLEW RATE	SOURce:FREquency:SLEW:IMMEDIATE <NR1>	SOURce:FREquency:SLEW:IMMEDIATE ?	Set the output frequency slew rate (Hz/s)	✓	✓
SET VOLTAGE (AC)	SOURce:VOLTage:LEVel:IMMEDIATE:AMPLitude:AC <NR2>	SOURce:VOLTage:LEVel:IMMEDIATE:AMPLitude:AC ?	Set the output voltage in AC	✓	✓
SET VOLTAGE (DC)	SOURce:VOLTage:LEVel:IMMEDIATE:AMPLitude:DC <NR2>	SOURce:VOLTage:LEVel:IMMEDIATE:AMPLitude:DC ?	Set the output voltage in DC	✓	✗
SET VOLTAGE SLEW RATE	SOURce:VOLTage:SLEW:IMMEDIATE <NR1>	SOURce:VOLTage:SLEW:IMMEDIATE ?	Set the output voltage slew rate (V/s)	✓	✓
SET PHASE	SOURce:PHASe:IMMEDIATE <NR2>	SOURce:PHASe:IMMEDIATE ?	Set the output phase of the three phase machines	✗	✓
READ ALARMS (IxQSC)	-	STATus:QUEStionable:INSTrument:ISUMmary:CONDition ?	Read alarms (register not cleared when read)	✓	✓
READ ALARMS (IxQSCEV)	-	STATus:QUEStionable:INSTrument:ISUMmary:EVENT ?	Read alarms (register cleared when read)	✓	✓
READ ALARMS ALL (QSC)	-	STATus:QUEStionable:CONDition?	Register with the logical OR of enabled alarms of all the alarms in the READ ALAMRS	✓	✓
READ ALARMS ALL (QSEV)	-	STATus:QUEStionable:EVENT?	Register with the logical OR of enabled alarms of all the alarms in the READ ALAMRS (register cleared when read)	✓	✓
IDN?	-	IDN ?	The machine reply with the model code and Firmware version of the machine	✓	✓
Serial Number	-	SYSTem:SN ?	The machine reply with the serial number of the machine	✓	✓
Display FW Revision	-	SCPI:DISP?	The machine reply with the display firmware revision of the machine	✓	✓
DSP FW Revision	-	SCPI:DSP?	The machine reply with the DSP firmware revision of the machine	✓	✓
Enable ext TRF	TRafo:OUT ON OFF	TRafo:OUT ?	Enable/Disable external transformer full scale value	✗	✓
Set Ext trf value	TRafo:FS <NR1>	TRafo:FS ?	Set external transformer full scale value [Vx10]	✗	✓
CLEAR REGISTERS	*CLS	-	Command to clear the queues in the registers (error,alarms etc..)	✓	✓
STANDARD OPERATION REGISTER (OSC)	-	STATus:OPERation:CONDition ?	This register contains the standard operational condition of the machine, like "busy", "Ramp_in_progress" or "Blocking alarm"	✓	✓
STANDARD OPERATION REGISTER (OSEV)	-	STATus:OPERation:EVENT ?	Same as standard Operation Register, but the register queue is cleared when read	✓	✓
SB	-	*STB ?	Query the status byte register	✓	✓
SESEV	-	*ESR ?	Query the SESEV	✓	✓

5. TPS COMMANDS

5.1. SYSTEM sub-system

The SYSTem subsystem allows to change some of the machine main configurations.

SYSTem

:CONFigure
 :NOUTput 1|3
 :ERRor?
 :LOCal
 :REMote
 :OPTions?

5.1.1. MONO

SYSTem:CONFigure:NOUTput

This command sets the power source to a single phase or to a three phases.

Comand Syntax: SYSTem:CONFigure:NOUTput 1|3

Example: SYST:CONF:NOUT 1

Query Syntax : SYSTem:CONFigure:NOUTput?

Return parameter: 1|3

5.1.2. ERROR QUEUE

SYSTem:ERRor?

This command queries the error queue, showing the last error with it's code and string.

Query Syntax : SYSTem:ERRor?

Return parameter: <NR1>, <CRD>

<NR1>	<CRD>
0	No Error
-100	Command Error
-102	Syntax Error
-200	Execution Error
-220	Parameter Error
-350	Queue Overflow

5.1.3. LOCAL

SYSTem:LOCaI

This command sets TPS in local state, which enables the front panel controls.

Comand Syntax: SYSTem:LOCaI
 Example: SYST:LOC
 Query Syntax : SYSTem:LOCaI?
 Return parameter: 0|1 (0=Disabled, 1=Enabled)

5.1.4. REMOTE

SYSTem:REMote

This command sets the interface in remote state, which disables all front panel controls.

Comand Syntax: SYSTem:REMote
 Example: SYST:REM
 Query Syntax : SYSTem:REMote?
 Return parameter: 0|1 (0=Disabled, 1=Enabled)

5.1.5. OPTIONS INSTALLED

SYSTem:OPTions?

Phase Selectable

This command returns the options installed in TPS.

Query Syntax : SYSTem:OPTions?
 Return parameter: <NR1> (MSB), <NR1> (LSB)

Installed Options						
Bit position	5-15	4	3	2	1	0
Bit name	Not used	Range	3-PHASE	DC	OUT	Not Used

- OUT: Output relay.
- DC : DC mode.
- 3-PHASE: 1/3-phase mode **(Only for three phase machines)**
- RANGE: Range selection.

5.1.6. SERIAL NUMBER

SYSTem:SN?

This command returns the Serial Number of the controlled machine

Query Syntax : SYSTem:SN?
Return parameter: <NR1> (MSB), <NR1> (LSB)

5.2. INSTRUMENT sub-system

INSTrument

:SElect 1|2|3
:COUPle ALL|NONE

5.2.1. SELECT PHASE

INSTrument:SElect

This command may be used to select a specific phase in three-phase mode. This command is not enabled in single-phase machines.

Comand Syntax: INSTrument:SEL 1|2|3
Example: INST:SEL 1
Query Syntax : INST:SEL?
Return parameter: 1|2|3

5.2.2. COUPLE PHASES

INSTrument:COUPle

This command may be used to couple all output phases in three-phase mode. When the phases are coupled, output voltage and output phase can be programmed for all three phases using a single command and without the need to select each phase individually.

Comand Syntax: INSTrument:COUPle ALL|NONE
Example: INST:COUP ALL
Query Syntax : INST:COUP?
Return parameter: ALL|NONE

Note: When uncoupled, use the *INST:SEL* command to select a specific output phase.

5.3. MEASURE sub-system

MEASure

```
[:SCALar]
  :CURRent
  :AC?
  [:DC]?
  :VOLTage
  :AC?
  [:DC?]
```

5.3.1. MEASURE OUTPUT CURRENT (AC)

MEASure[:SCALar]:CURRent:AC?

Phase Selectable

This query returns the mean of the rectified ac current being sourced at the output terminal of the power supply. This command should be used when the voltage mode of the source is set for AC.

Query Syntax : MEASure[:SCALar]:CURRent:AC?
 Parameter: None
 Example: MEAS:CURR:AC?
 Return parameter: <NR2>

5.3.2. MEASURE OUTPUT CURRENT (DC)

MEASure[:SCALar]:CURRent[:DC]?

Phase Selectable

This query returns the dc component of the current being sourced at the output terminal of the power supply. This command should be used when the voltage mode of the source is set for DC.

Query Syntax : MEASure[:SCALar]:CURRent[:DC]?
 Parameter: None
 Example: MEAS:CURR?
 Return parameter: <NR2>

5.3.3. MEASURE OUTPUT VOLTAGE (AC)

MEASure[:SCALar]:VOLTage:AC?

Phase Selectable

This query returns the ac rms voltage at the output terminal of the power supply. This command should be used when the voltage mode of the source is set for AC.

Query Syntax : MEASure[:SCALar]:VOLTage:AC?
 Example: MEAS:VOLT:AC?
 Return parameter: <NR2>

5.3.4. MEASURE VOLTAGE (DC)

MEASure[:SCALar]:VOLTage[:DC]?

Phase Selectable

This query returns the dc component of the voltage at the output terminal of the power supply. This command should be used when the voltage mode of the source is set for DC.

Query Syntax : MEASure[:SCALar]:VOLTage[:DC]?

Example: MEAS:VOLT?

Return parameter: <NR2>

5.4. OUTPUT sub-system

OUTPut

[[:STATE] <parameter>

5.4.1. OUTPUT RELAY

OUTPut[:STATE]

This command enables or disables the TPS/D output.

Comand Syntax: OUTPut[:STATE] 0|1

Example: OUTP 1

Query Syntax : OUTPut[:STATE]?

Return parameter: 0|1

5.5. SOURCE sub-system

```

[SOURce:]
  CURRent
    :INRush 0|1
    [:LEVel]
      [:IMMEDIATE]
        [:AMPLitude] <n>

    :PROTection
      :STATe <bool>
      :DELay <NR1>
      :TYPE <NR2>

  FREQuency
    [:IMMEDIATE] <NR2>
    SLEW
      [:IMMEDIATE]

  MODE AC|DC
  PHASe
    [:IMMEDIATE] <NR2>

  VOLTage
    [:LEVel]
      [:IMMEDIATE]
        [:AMPLitude]
          :AC <NR2>
          [:DC] <NR2>

    :RANGE 150|300
    :SENSe
      [:SOURce] INT|EXT
    :SLEW
      [:IMMEDIATE] <NR1>|MAX

```

5.5.1. INRUSH

[SOURce:]CURRent:INRush

This command enables inrush option.

Command syntax: [SOURce:]CURRent:INRush 0|1

Example: CURR:INR 1

Query Syntax: [SOURce:]CURRent:INRush?

Return parameter: 0|1|2|3

5.5.2. SET ILIM

[SOURce:]CURRent:LEVel:IMMediate:AMPLitude

Phase Selectable

This command sets the rms/peak current limit of the output.

Comand Syntax: [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude] <NR2>
 Parameter: <NR2>
 Unit : [A] (rms)
 Example: CURR 5
 Query Sintax: [SOURce:]CURRent[:LEVel][:IMMediate][:AMPLitude]?
 Returned Parameter: <NR2>

Related Commands: *CURR:PROT:STAT* *CURR:PROT:DEL* *CURR:PROT:TYP*

5.5.3. ENABLE RMS/PEAK LIM

[SOURce:]CURRent:PROtection:STATe

This command enables RMS or Peak current limitation.

Comand Syntax: [SOURce:]CURRent:PROtection:STATe <bool>
 Parameter: 0|1|OFF|ON
 *RST VALUE: ON
 Example: CURR:PROT:STAT 0
 Query Sintax: [SOURce:]CURRent:PROtection:STATe?
 Returned Parameters: 0|1

5.5.4. ILIM DELAY

CURRent:PROtection:DELay

This command sets the delay time with which the RMS overcurrent protection intervenes.

Comand Syntax: [SOURce:]CURRent:PROtection:DELay
 Parameter: 2..60
 Unit : seconds
 Example: CURR:PROT:DEL 2
 Query Sintax: CURR:PROT:DEL?
 Returned Parameters: <NR1>

5.5.5. RMS/PEAK LIM

[SOURce:]CURRent:PROTection:TYPe

You can select the type of the limit you want to set.

Comand Syntax: [SOURce:]CURRent:PROTection:TYPe <CRD>
 Parameter: RMS/PEAK
 *RST VALUE: RMS
 Example: CURR:PROT:TYP RMS
 Query Syntax: CURR:PROT:TYP?
 Returned Parameters: <CRD> RMS,PEAK

5.5.6. SET FREQUENCY

[SOURce:]FREQUency[:IMMediate]

Same for all Phases

This command sets the frequency of the output waveform. The frequency must be in the range programmed with [SOURce:]FREQUency:RANGe.

Comand Syntax: [SOURce:]FREQUency[:IMMediate] <NR2>
 Example: FREQ 50
 Query Syntax : [SOURce:]FREQUency[:IMMediate]?
 Return parameter: <NR2>

Format allowed for parameter <NR2>

.
.N
.NN
N.
N.N
NN.N
NN.
NN.N
NN.NN
NNN.
NNN.N
N
NN
NNN

5.5.7. SET FREQUENCY SLEW RATE

[SOURce:]FREQuency:SLEW[:IMMEDIATE]

This command sets the rate at which frequency changes for all programmed changes in output frequency. Instantaneous frequency changes can be obtained by sending MAX.

Comand Syntax: [SOURce:]FREQuency:SLEW[:IMMEDIATE] <NR1>
 Parameter: 1 to 3100 Hz/s | MAX
 Example: FREQ:SLEW:IMM 75
 FREQ:SLEW MAX

Query Syntax: [SOURce:]FREQuency:SLEW?
 Return parameter: <NR1> | MAX

Format allowed for parameter <NR1>
N
NN
NNN
NNNN
NNNNN
MAX

5.5.8. AC/DC

[SOURce:]MODE

This command allows switching between the AC and DC output mode of the power source.

Comand Syntax: [SOURce:]MODE AC|DC
 Example: MODE AC
 Query Syntax : [SOURce:]MODE?
 Return parameter: AC|DC

5.5.9. SET PHASE

[SOURce:]PHASe[IMMEDIATE]

Phase Selectable

This command sets the phase of the output voltage waveform relative to an internal trigger.

Comand Syntax: [SOURce:]PHASe[:IMMEDIATE] <NR2>
 Parameter: 0 to 360.0 deg (No decimal values)
 Example: PHAS 45

Query Syntax : [SOURce:]PHASe[:IMMEDIATE]?
 Return parameter: <NR2>

Format allowed for parameter <NR2>
.
.N
N.
NN.
NN.N
NNN.
NNN.N
N
NN
NNN

5.5.10. SET VOLTAGE (AC)

[SOURce:]VOLTage[:LEVel][:IMMEDIATE][:AMPLitude]:AC

Phase Selectable

This command programs the ac rms output voltage of the TPS. The voltage mode must be set to AC to accept an ac voltage.

Comand Syntax: [SOURce:]VOLTage[:LEVel][:IMMEDIATE][:AMPLitude]:AC <NR2>
 Parameter: 0 to value programmed with [SOURce:]VOLTage:RANGe.
 Example: VOLT:AC 250
 Query Syntax : [SOURce:]VOLTage[:LEVel][:IMMEDIATE][:AMPLitude]:AC?
 Return parameter: <NR2>

Format allowed for parameter <NR2>
.
.N
N.
N.N
NN.
NN.N
NNN.
NNN.N
N
NN
NNN

5.5.11. SET VOLTAGE (DC)

[SOURce:]VOLTage[:LEVel][:IMMEDIATE][:AMPLitude][:DC]

Phase Selectable

This command programs the dc output voltage of the TPS/D. The voltage mode must be set to DC to accept a dc voltage.

Comand Syntax: [SOURce:]VOLTage[:LEVel][:IMMEDIATE][:AMPLitude][:DC] <NR2>
 Parameter: 0 to value programmed with [SOURce:]VOLTage:RANGe.
 Example: VOLT 250

Format allowed for parameter <NR2>
.
.N
N.
N.N
NN.
NN.N
NNN.
NNN.N
N
NN
NNN

Query Syntax : [SOURce:]VOLTage[:LEVel][:IMMEDIATE][:AMPLitude][:DC]?
 Return parameter: <NR2>

5.5.12. RANGE

[SOURce:]VOLTage:RANGe

This command sets the voltage range of the TPS. Ranges available are 150 V and 300 V.

Comand Syntax: [SOURCE:]VOLTage:RANGe 150|300
 Example: VOLT:RANG 150
 Query Syntax : [SOURce:]VOLTage:RANGe?
 Return parameter: 150|300

5.5.13. SENSE

[SOURce:]VOLTage:SENSe[:SOURce]

This command selects the source from which the output voltage is sensed. The following voltage sense sources can be selected: INT (2 wires) or EXT (4 wires).

Comand Syntax: [SOURce:]VOLTage:SENSe[:SOURce] INT|EXT

Example: VOLT:SENS:SOUR INT

Query Syntax : [SOURce:]VOLTage:SENSe[:SOURce]?

Return parameter: INT|EXT

5.5.14. VOLTAGE SLEW RATE

[SOURce:]VOLTage:SLEW[:IMMEDIATE]

Phase Selectable

This command sets the slew rate for all programmed changes in the output voltage level of the source. Instantaneous voltage changes can be obtained by sending MAX.

Comand Syntax: [SOURce:]VOLTage:SLEW[:IMMEDIATE] <NR1>

Parameter: 1 to 3000 V/s | MAX

Example: VOLT:SLEW 1

VOLT:SLEW MAX

Format allowed for parameter <NR1>
N
NN
NNN
NNNN
NNNNN
MAX

Query Syntax : [SOURce:]VOLTage:SLEW[:IMMEDIATE]?

Return parameter: <NR1>

5.5.15. ENABLE EXTERNAL TRANSFORMER

[SOURce:]TRafo:OUT

This command Enables/disables the external transformer full scale value

Comand Syntax: [SOURce:] TRafo:OUT
 Parameter: ON (1) | OFF (0)
 Example: TRafo:OUT ON
 TRafo:OUT OFF
 Query Syntax : TRafo:OUT?
 Return parameter: ON | OFF

5.5.16. EXTERNAL TRANSFORMER FULL SCALE VALUE

[SOURce:]TRafo:FS

This command set the full scale value for the external transformer in Vx10

Attention: Use only if a external transformer is connected to the TPS. Full scale must be the same value as the full scale of the external transformer.

Comand Syntax: [SOURce:] TRafo:FS <NR1>
 Parameter: <NR1>

Format allowed for parameter <NR1>
N
NN
NNN
NNNN
NNNNN

Example: TRafo:FS 6000
 Set the full scale to 600V
 Query Syntax : TRafo:FS?
 Return parameter: <NR1>

5.6. TRIGGER sub-system

TRIGger

[[:SEQuence]

:SOURce <parameter>

5.6.1. SYNC

TRIGger[:SEQuence]:SOURce

This command selects the trigger source: internal (INT) or ac line voltage (LINE).

With “*SYNC=LINE*” it is not possible to set the frequency but it is fixed at the input line frequency.

Comand Syntax: TRIGger[:SEQuence]:SOURce INT|LINE

Example: TRIG INT

Query Syntax : TRIGger[:SEQuence]:SOURce?

Return parameter: INT|LINE

5.7. STATUS sub-system

STATus

:OPERation

:CONDition?

:ENABle <NR1>

:EVENT?

:QUEStionable

:CONDition?

:ENABle <NR1>

:EVENT?

:INSTrument

:ISUMmary

:CONDition?

:ENABle <NR1>

:EVENT?

5.7.1. OPERATION CONDITION REGISTER

STATus:OPERation:CONDition?

This query returns the value of the “Operation Status Condition Register” (OSC).

Query Syntax : STATus:OPERation:CONDition?

Return parameter: <NR1>

Example: STAT:OPER:COND?

5.7.2. OPERATION EVENT REGISTER

STATus:OPERation:EVENT?

This query returns the value of the “Operation Status Event Register” (OSEV) and then clears the register.

Query Syntax : STATus:OPERation:EVENT?
 Example: STAT:OPER:EVEN?
 Return parameter: <NR1>

5.7.3. QUESTIONABLE CONDITION REGISTER

STATus:QUESTionable:CONDition?

This query returns the value of the “Questionable Status Condition Register” (QSC).

Query Syntax : STATus:QUESTionable:CONDition?
 Example: STAT:QUES:COND?
 Return parameter: <NR1>

5.7.4. QUESTIONABLE EVENT REGISTER

STATus:QUESTionable:EVENT?

This query returns the value of the “Questionable Status Event Register” (QSEV) and then clears the register.

Query Syntax : STATus:QUESTionable:EVENT?
 Return parameter: <NR1>
 Example: STAT:QUES:EVEN?

5.7.5. INSTRUMENT CONDITION REGISTER

STATus:QUESTionable:INSTrument:ISUMmary:CONDition?

Phase selectable

This query returns the value of the “Instrument Summary Questionable Status Condition Register” (IxSQSC) for a specific output of TPS.

Query Syntax : STATus:QUESTionable:INSTrument:ISUMmary:CONDition?
 Example: STAT:QUES:INST:ISUM:COND?
 Return parameter: <NR1>

5.7.6. INSTRUMENT EVENT REGISTER

STATus:QUEStionable:INSTrument:ISUMmary:EVENT?

Phase selectable

This query returns the value of the “Instrument Summary Questionable Status Event Register” (IxSQSEV) and then clears the register.

Query Syntax : STATus:QUEStionable:INSTrument:ISUMmary:EVENT?
 Parametro restituito: <NR1>
 Example: STAT:QUES:INST:ISUM:EVEN?

5.8. Common Command Dictionary

Common commands begin with a “*” and consist of three letters and/or one “?” (query).

5.8.1. CLEAR

*CLS

Clear Registers.

This command clears the following registers:

1. All Event Registers (IxSQSEV, QSEV, OSEV, SESEV)
2. Status Byte Register (SB)
3. Error Queue

Comand Syntax: *CLS
 Parameter: None.

5.8.2. PROGRAM SESEN

*ESE

This command programs the Standard Event Status Enable Register (SESEN).

Comand Syntax: *ESE <NR1>
 Parameter: 0 ÷ 255
 Reset value: 0
 Example: *ESE 129

Query Syntax : *ESE?
 Return parameter: <NR1> (Value of Standard Event Status Enable Register).

5.8.3. RESET

***RST**

Reset power source

This command resets the power source.

Comand Syntax: *bRST
Parameter: None

5.8.4. PROGRAM SRE

***SRE**

This command programs the Service Request Enable Register (SRE)

Comand Syntax: *SRE <NR1>
Parameter: 0 ÷ 255
Example: *SRE 255

Query Syntax : *SRE?
Return parameter: <NR1>

5.8.5. READ SB

***STB?**

Query the Status Byte Register (SB).

This query reads the Status Byte Register but does not clear it; returns MSS in bit 6.

Query Syntax : *STB?
Return parameter: <NR1>

5.8.6. READ SESEV

***ESR?**

Query the Standard Event Status Event Register (SESEV) and then clears it.

Query Syntax: *ESR?
Return parameter: <NR1>

5.8.7. MACHINE ID AND POWER CODE

*IDN

Returns the AC source identification string. It returns the data in four fields separated by commas (,).

Query Syntax: *IDN?
 Return Parameter: 0 , <Machine_code> , <Power_code> , <Firmware_version>
 Example: 0,16,50,5

<i>Machine Code</i>	
10	TPS/T/D
16	TPS/M/D

The power code depends on the installed power of the power supply.

5.8.8. DISPLAY FIRMWARE REVISION

*SCPI:DISP?

Returns the machine display firmware version

Query Syntax: *SCPI:DISP ?
 Return Parameter: <Display_fw_version>
 Example: 92

5.8.9. DSP FIRMWARE REVISION

*SCPI:DSP?

Returns the machine display firmware version

Query Syntax: *SCPI:DSP ?
 Return Parameter: <DSP_fw_version>
 Example: 8

5.9. Status Registers

Status registers contain the operating condition of TPS at any time (see the following diagram).

5.9.1. Instrument Summary Questionable Status

Because the ac source could be three-phase, each phase is organized in a questionable group of registers that record information specific to each particular phase. These registers are called Instrument Summary Questionable Status Registers (IxSQSC).

Name	Instrument Summary Questionable Status Register (1 identical register for each phase)	Command	Description
IxSQSC ($x = 1, 2, 3$)	Condition	STAT:QUES:INST:ISUM:COND?	This is a read-only register which contains the real-time status of the circuits being monitored.
IxSQSEV ($x = 1, 2, 3$)	Event	STAT:QUES:INST:ISUM:EVEN?	This is a read-only register that latches any condition. It is identical to IxSQSC, but it is cleared when read.

IxSQSC										
Bit position	14	13	12	11	10	9	4	2	1	0
Bit name	EEPROM	ILIMIT	DV/DT	INVERTER	UNDER VOLT	OVER VOLT	OVER TEMP	REM SET	INV SEQ	INV COM

OVERTEMP	Set when over temperature
OVERVOLT	Set when over voltage
UNDERVOLT	Set when under voltage
INVERTER	Set when inverter alarm
DV/DT	Set when dV/dT (rate of rise of output voltage) is too high
ILIMIT	Set when current limit alarm
EEPROM	Eeprom error
REMSET	Remote settings

INV SEQ	Inverter sequence
INV COM	Inverter communication

5.9.2. Questionable Status Registers

The Questionable Status Registers summarizes the IxSQSC and IxSQSEV registers.

Name	Questionable Status Register	Command	Description
QSC	Condition	STAT:QUES:COND?	This is a read-only register which is the logical OR of the enabled bit of the IxSQSC registers.
QSEV	Event	STAT:QUES:EVEN?	This is a read-only register that latches any condition. It is identical to QSC, but it is cleared when read.

QSEC			
Bit position	15-14	13	12-0
Bit name	---	INSTRUMENT SUMMARY	---

INSTRUMENT SUMMARY The logical OR of the enabled bits of IxSQSC

5.9.3. Operation Status Registers

The Operation Status Registers records signal that occurs during normal operation.

Name	Operation Status Register	Command	Description
OSC	Condition	STAT:OPER:COND?	This is a read-only register which contains the real-time status of the circuits being monitored.
OSEV	Event	STAT:OPER:EVEN?	This is a read-only register that latches any condition. It is identical to OSC, but it is cleared when read.

OSC					
Bit position	15-9	10	9	8	7-0
Condition	---	BLOCKING ALARM	BUSY	RAMP IN PROGRESS	---

RAMP IN PROGRESS Set when a ramp is in progress.

BUSY Set when the power source receives a command before the execution of the previous command is completed.

BLOCKING ALARM Set when an alarm disables the TPS.

5.9.4. Standard Event Status Registers

This group consists of an Event Register and an Enable Register that are programmed by common commands.

Name	Standard Event Status Register	Command	Description
SESEV	Event	*ESR?	This is a read-only register that latches any condition. It is cleared when read.

STANDARD EVENT STATUS EVENT REGISTER								
Bit position	7	6	5	4	3	2	1	0
Bit name	---	---	CME	EXE	DDE	---	---	---

DDE Device Dependent Error: set when error code is in the range [-399, -300]

EXE Execution Error: set when error code is in the range [-299, -200]

CME Command Error: set when error code is in the range [-199, -100]

5.9.5. Error Queue

The Error Queue is a First-In, First-Out buffer that stores errors as they occur. As it is read, each error is removed from the queue. When all errors have been read, the query returns "0, No Error". If more errors are accumulated than the queue can hold, the last error queue is "-350, Queue Overflow".

5.9.6. Status Byte Register

Name	Register	Command	Description
SB	Status Byte	*STB?	This register summarizes the information from all other status groups.

SB						
Bit position	7	6	5	4	3	2-0
Bit name	OPER	MSS	ESB	MAV	QUES	---

QUES Questionable Status Summary

MAV Message Available.
It is set whenever the Error Queue holds one or more error.

ESB Standard Event Status Summary

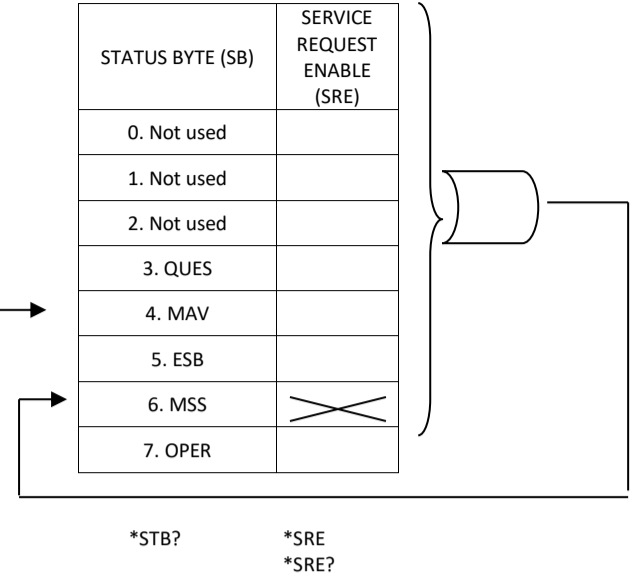
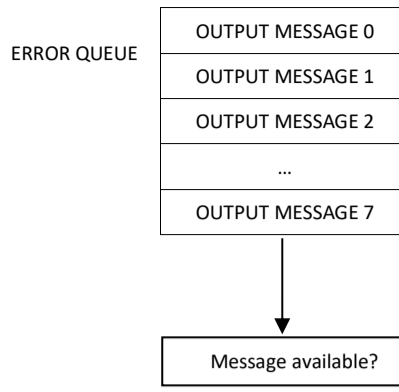
MSS Master Status Summary
The MSS bit is a real-time summary of all Status Byte Register bits that are enabled by the Service

Request Enable Register.
Command *STB? Reads the data in the register but does not clear it; returns MSS in bit 6.

OPR Operation Status Summary

INSTRUMENT R SUMMARY QUESTIONABLE STATUS

CONDITION (I1SQSC)	EVENT (I1SQSEV)
0. INV COM	
1. INV SEQ	
2. REM SET	
3. Not Used.	
4. OVERTEMP	
5. Not used	
6. Not used	
7. Not used	
8. Not used	
9. OVERTEMP	
10. UNDERVOLT	
11. INVERTER	
12. DV/DT	
13. ILIMIT	
14. EEPROM	
15. Not used	



QUESTIONABLE STATUS

CONDITION (QSC)	EVENT (QSEV)	ENABLE (QSEN)
0. Not used		
1. Not used		
2. Not used		
3. Not used		
4. Not used		
5. Not used		
6. Not used		
7. Not used		
8. Not used		
9. Not used		
10. Not used		
11. Not used		
12. Not used		
13. INSTR. SUM.		
14. Not used		
15. Not used		

INSTRUMENT S SUMMARY QUESTIONABLE STATUS

CONDITION (I2SQSC)	EVENT (I2SQSEV)
0. INV COM	
1. INV SEQ	
2. REM SET	
3. Not Used.	
4. OVERTEMP	
5. Not used	
6. Not used	
7. Not used	
8. Not used	
9. OVERTEMP	
10. UNDERVOLT	
11. INVERTER	
12. DV/DT	
13. ILIMIT	
14. EEPROM	
15. Not used	

INSTRUMENT T SUMMARY QUESTIONABLE STATUS

CONDITION (I3SQSC)	EVENT (I3SQSEN)
0. INV COM	
1. INV SEQ	
2. REM SET	
3. Not Used.	
4. OVERTEMP	
5. Not used	
6. Not used	
7. Not used	
8. Not used	
9. OVERTEMP	
10. UNDERVOLT	
11. INVERTER	
12. DV/DT	
13. ILIMIT	
14. EEPROM	
15. Not used	

OPERATION STATUS

CONDITION (OSC)	EVENT (OSEV)	ENABLE (OSEN)
0. Not used		
1. Not used		
2. Not used		
3. Not used		
4. Not used		
5. Not used		
6. Not used		
7. Not used		
8. RAMP IN PROGRESS		
9. BUSY		
10. BLOCKING ALARM		
11. Not used		
12. Not used		
13. Not used		
14. Not used		
15. Not used		

STANDARD EVENT STATUS

EVENT (SESEV)	ENABLE (SESEN)
0. Not used	
1. Not used	
2. Not used	
3. DDE	
4. EXE	
5. CME	
6. Not used	
7. Not used	

*ESR
*ESE?

6. ERROR MESSAGES

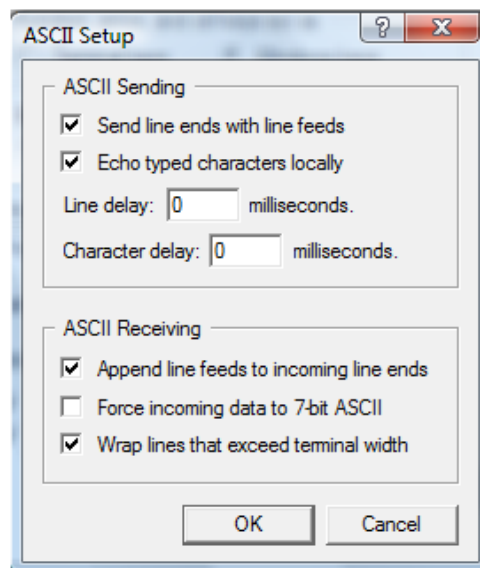
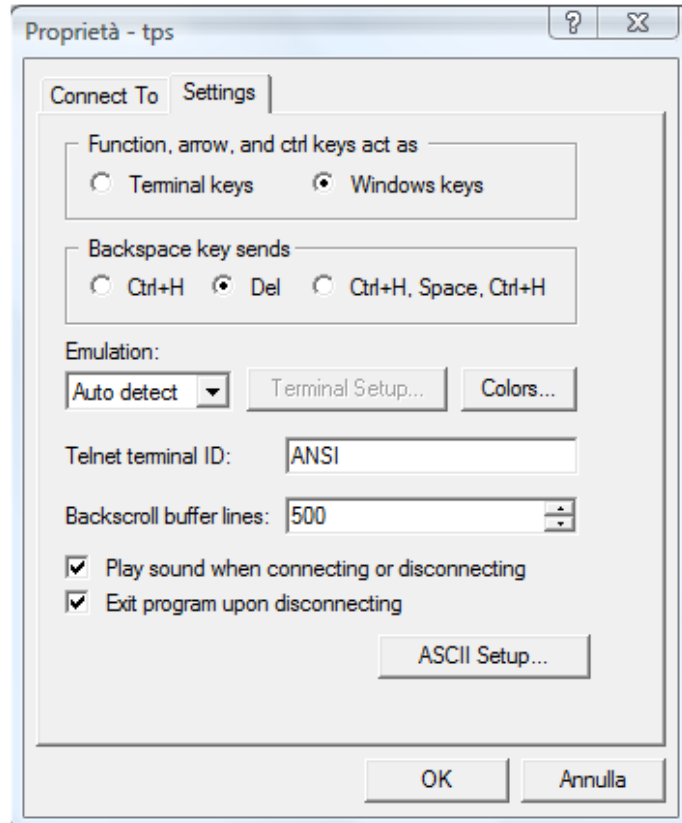
Error Number	Error String
0	No Error
-100	Command Error
-102	Syntax Error
-200	Execution Error
-220	Parameter Error
-350	Queue Overflow

Warning: after a command that changes the configuration of the TPS (local/remote, range high/low, 1-phase/3-phase), it is necessary to wait at least 10 s before sending another command, otherwise the machine may be busy when executing the second command and an error may occur.

7. HYPER TERMINAL CONFIGURATION

Configure Hyper Terminal as follows for use with TPS.

To enter a command, the ENTER key has to be pressed within 20 s from last character input, otherwise a timeout occurs and user has to type command followed by ENTER again.



8. REFERENCES

Number	Title	Version	Date	Author
1	Standard Commands for Programmable Instruments (SCPI)	1999.0	May-99	SCPI Consortium

9. REVISION INDEX

Elettrotest Spa is committed to a program of continuous improvement of products and information to the customer.

Therefore, the company reserves the right to make changes to the documentation and specifications without notice and assumes no responsibility for any incorrect information.

04_	Changes for trafo out implementation (RP010.24)	16/09/24	A.Ferro	A.Ferro	R.Veronese
03B	Serial & LAN parameters info added	09/07/24	A.Ferro	A.Ferro	R.Veronese
03A	SYSTEM:SN? – SCPI:DISP? – SCPI:DSP? Commands added	15/03/2024	A.Ferro	A.Ferro	R.Veronese
03_	Changes for power code implementation on *IDN?	24/08/23	A.Ferro	M.Rigobello	R.Veronese
02_	Changes for TPS/T/D implementation (DPP001.21) and TPS/M/D FW update v.069 (UT003.22)	07/06/23	A.Ferro	M.rigobello	R.Veronese
01_	Changes related to I _{PEAK} ed I _{RMS} management (UT005.20)	09/06/22	A.Ferro	M.Rigobello	R.Veronese
00_	First Emission	02/03/22	A.Ferro	M.Rigobello	R.Veronese
Rev.	Description	Date	Author	Verified	Approved