

## IX. Appendix

### 9.1 Transportation and storage

#### 9.1.2 Packaging

Follow the packaging requirements before shipment to protect the controller against shock, moisture and water.

#### 9.1.3 Transportation

Ensure safe handling with the controller shipment and mark all packages as “fragile”.

#### 9.1.4 Storage

The controller shall be kept according to the following requirements:

- 1) Storage temperature: (-20~70)°C;
- 2) Storage moisture: <90%;
- 3) Put it at clean and cool places, and avoid direct exposure to the sun;
- 4) No vibration.

### 9.2 Pressure unit list

S/N	Unit	Unit name supported by SCPI	Unit number supported by SCPI
1	Pa	Pa	0
2	kPa	kPa	1
3	hPa	hPa	12
4	MPa	MPa	2
5	mbar	mbar	5
6	bar	bar	4

S/N	Unit	Unit name supported by SCPI	Unit number supported by SCPI
7	psi	psi	3
8	mmHg@0°C	Hg	7
9	cmHg@0°C	cmHg	102
10	mHg@0°C	mHg	103
11	inHg@0°C	inHg	6
12	mmH <sub>2</sub> O@4°C	H <sub>2</sub> O	9

S/N	Unit	Unit name supported by SCPI	Unit number supported by SCPI
13	inH <sub>2</sub> O@4°C	inH <sub>2</sub> O	8
14	mH <sub>2</sub> O@4°C	mH <sub>2</sub> O@4C	105
15	mmH <sub>2</sub> O@20°C	mmH <sub>2</sub> O@20C	106
16	cmH <sub>2</sub> O@20°C	cmH <sub>2</sub> O@20C	107
17	mH <sub>2</sub> O@20°C	mH <sub>2</sub> O@20C	108
18	kgf/m <sup>2</sup>	kgf/m <sup>2</sup>	101
19	kgf/cm <sup>2</sup>	KGF	10
20	mtorr	mtorr	109
21	torr	torr	110

S/N	Unit	Unit name supported by SCPI	Unit number supported by SCPI
22	atm	atm	111
23	lb/ft <sup>2</sup>	lb/ft <sup>2</sup>	112
24	tsi	tsi	113
25	User1		-1
26	User2		-2
27	User3		-3
28	User4		-4
29	User5		-5
30	User6		-6

Table 9-1 Pressure unit list

### 9.3 SCPI List

Note: In this System, the pressure unit is always a separate parameter. The current/pressure unit can be a parameter together with its value.

S/N	Command	Description	Parameter	Return value
1	*CLS	The command removes the following register: Standard event register; Query event register; Operational event register; Status byte register; Error queue.	—	—

S/N	Command	Description	Parameter	Return value
2	*ESE <enable value>	Set the value of standard event enable register	<NRf>,0-255	—
3	*ESE?	Read the value of standard event enable register	—	<Nr1>
4	*ESR?	Read the value of standard event register. On execution of the order, the value of standard event register will be reset.	—	<Nr1>
5	*IDN?	In inquiring the apparatus marking, the return data shall be divided into 2 parts: a.Product series No; b.Software version No.	—	Product series No. and software Ver. No.
6	*OPC	After the equipment implements *OPC command, set the “operation complete” of standard event register at 1.	—	—
7	*OPC?	After *OPC? Order, return to 1.	—	1
8	*RST	Reset main program	—	—
9	*SRE <enable value>	Set the value of status byte enable register	<NRf>,0-255	—
10	*SRE?	Read the value of status byte enable register	—	<Nr1>
11	*STB?	Read the value of status byte register	—	<Nr1>
12	*WAI	Wait for completion of operation.	—	—

S/N	Command	Description	Parameter	Return value
13	MEASure[:SCALar] [:PRESsure<n>]?	Pressure measurement. n valuing 1~6. PRESsure1 means reading the pressure of pressure module under control (the value adjusted by air column under the currently set pressure type); PRESsure2 means reading the pressure of internal module (as original value); PRESsure3 means reading the pressure of external module (as original value); PRESsure4 means reading the pressure of positive pressure module (as original value); PRESsure5 means reading the pressure of negative pressure module (as original value); PRESsure6 means reading atmospheric pressure	—	Measurement value: name of unit
14	MEASure[:SCALar]: CURRent[:DC]?	Current measurement. On receiving the command, the controller sets the measurement item as mA measurement, conduct measurement, and return to the measurement value. The current measurement has only one range (-30~30) mA, displaying the fixed bit width of 6.	—	Measurement value

S/N	Command	Description	Parameter	Return value
15	MEASure[:SCALar]:VOL Tage[:DC]? [<range> MINimum  MAXimum]	Voltage measurement. On receiving the command, the controller may switch the range according to the parameters, conduct measurement, and return to the measurement value. The voltage measurement has two optional ranges, displaying the fixed bit width of 6.	Measurement range: <numeric_value> with unit or not. The unit is V by default, if no unit exists. If the value is (-0.3~0.3)V, choose the measurement range of (-300~300)mV with other values falling in (-30~30)V. MIN means the minimum measurement range of (-300~300) mV, and MAX the maximum range of (-30~30)V. If ignoring the parameters, we will choose the measurement range of (-30~30)V.	Measurement value
16	MEASure[:SCALar]:SWITCh [:CONNect]?	Switch on-off status checking. On receiving the order, the controller will set the measurement item as switch measurement, conduct measurement, and return to the measurement value.	—	1: On 0: Off
17	SENSe[:PRESSure]: MODE ABSolute GAUGE	Set pressure type.	ABSolute GAUGE	—
18	SENSe[:PRESSure]:MODE?	Read pressure type.	—	Pressure type

S/N	Command	Description	Parameter	Return value
19	SENSe[:PRESsure]:DIGit4 5 6 7 MINimum MAXimum	Set pressure display bit width. 7-bit width is displayed only by connecting to quartz sensor.	Bit width: MIN shows the currently supported minimum bit width; MAX shows the currently supported maximum bit width.	—
20	SENSe[:PRESsure]:DIGit? [MINimum MAXimum]	Read pressure display bit width.	MINimum shows the currently supported minimum bit width; MAXimum shows the currently supported maximum bit width; Ignore the parameters and return to the currently set bid width.	Bid width
21	SENSe[:PRESsure]:RANGe[:UPPer]?	Read the upper limit of measurement range of the currently controlled module	—	Upper limit of measurement range; name of unit
22	SENSe[:PRESsure]:RANGe[:LOWer]?	Read the lower limit of measurement range of the currently controlled module	—	Lower limit of measurement range; name of unit
23	[SOURce:]PRESsure <pressure_value>	Set targeted pressure value and output pressure.	Pressure value: <numeric_value> with the unit currently set by the system.	—
24	[SOURce:]PRESsure?	Read targeted pressure value.	—	Targeted pressure

S/N	Command	Description	Parameter	Return value
				value; name of unit
25	[SOURce:]PRESsure: SLEW <value>	Set pressure control rate.	Pressure control rate: <numeric_value> with the unit currently set by the system.	—
26	[SOURce:]PRESsure: SLEW? [LOWer UPPer]	Read pressure control rate.	LOWer: Read the lower limit of the pressure control rate UPPer: Read the upper limit of the pressure control rate	Pressure control rate; name of unit
27	[SOURce:]PRESsure: TOLerance <value>	Set pressure stability	Pressure stability <numeric_value>, %FS	—
28	[SOURce:]PRESsure: TOLerance?	Read pressure stability	—	Pressure stability
29	OUTPut[:PRESsure]:MODE CONTRol MEASure VENT	Set working mode of pressure module	CONTRol represents control mode; MEASure represents measurement mode; VENT represents venting mode.	—
30	OUTPut[:PRESsure]: MODE?	Read working mode of pressure module	—	Working mode of pressure module
31	OUTPut[:PRESsure]: STABLE?	Read pressure stability status	—	1: Stable; 0: unstable
32	CALCulate[:PRESsure] :LIMit:LOWer <low>	Set the lower limit of pressure	Lower limit of pressure with the unit currently set by the system	—

S/N	Command	Description	Parameter	Return value
33	CALCulate[:PRESSure]: LIMit:LOWer?	Read the lower limit of pressure	—	Lower limit of pressure; name of unit
34	CALCulate[:PRESSure]: LIMit:UPPer <high>	Set the upper limit of pressure	Upper limit of pressure with the unit currently set by the system	—
35	CALCulate[:PRESSure]: LIMit:UPPer?	Read the upper limit of pressure	—	Lower limit of pressure; name of unit
36	CALCulate[:PRESSure]: LIMit:STATe <Boolean> ON OFF	Set whether the output range limit is enabled.	1,ON: Enabled 0,OFF: Prohibited	—
37	CALCulate[:PRESSure]: LIMit:STATe?	Inquire whether the output range limit is enabled.	—	1: Enabled 0: Prohibited
38	CALCulate[:PRESSure]: LIMit:VENT <value>	Set venting pressure	Venting pressure <numeric_value> with the unit currently set by the system	—
39	CALCulate[:PRESSure]: LIMit:VENT?	Read venting pressure	—	Venting pressure; name of unit
40	SYSTem:VERSion?	Return to the SCPI Ver. No. followed by the system.	—	Ver. No.
41	SYSTem:ERRor[:NEXT]?	Check next error item in the error queue, and delete the item from the queue. The	—	Error information



S/N	Command	Description	Parameter	Return value
		error queue can store 50 pieces of error information. The last piece will be replaced by -350"Queue overflow" in the case of over 50 pieces. System power off or *CLS order can remove error queue.		
42	UNIT[:PRESsure] <unit_name> <unit_ID>	Set pressure unit	Unit: It may be unit name as quoted character string or unit ID as numbers.	—
43	UNIT[:PRESsure]?	Read pressure unit	—	Name of unit
44	STATus:OPERation:ENABLE<enable value>	Set operation status enable register	Enable value: <numeric_value>,0-65535	—
45	STATus:OPERation:ENABLE?	Read operation status enable register	—	<enable value>:NR1
46	STATus:OPERation[:EVENT]?	Read the value of operation status register. On execution of the command, the value of operation status register shall be reset.	—	<value>:NR1
47	STATus:QUESTionable:ENABLE <enable value>	Set problem data enable register	Enabling value: <numeric_value>,0-65535	—
48	STATus:QUESTionable:ENABLE?	Read problem data enable register	—	<enable value>:NR1
49	STATus:QUESTionable[:EVENT]?	Read the value of problem data incident register	—	<value>:NR1

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S/N	Command	Description	Parameter	Return value
50	STATus:PRESet	Remove the value operation status enable register and problem data enable register	—	—

Table 9-1 SCPI Summary