Digital Readout
DR600/DR700

solartron metrology

user manual

CE

Index

1.0 Using this Manual

DR600/ DR700

The Digital Readout functions are covered in six sections:

Operation mode	DR600/700
Setup mode	DR600/700
Gauging mode	DR700 only
MaxA + MaxB mode	DR700 only
Scaling Factor mode	DR700 only
Peak mode	DR700 only

“Operation mode” shows you how to use the functions which are immediately available to you without the need to first set them up.

“Setup mode” shows you how to use the functions which are accessed in setup mode or which must first be configure using “Setup mode”.

The following symbols are adopted in this manual:

indicates that the lamp is “on”

indicates that the lamp is flashing

represents a key which performs a specific action

e.g. enter

represents a “softkey”

e.g. preset

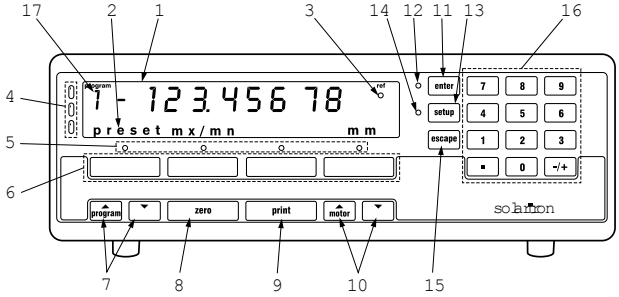
DR600

Page or function applies to DR600

DR700

Page or function applies to DR700

2.0 Layout of Controls



1. Numeric display - shows readings.
2. Information display - shows user information and soft key legends.
3. Reference lamp - on when in reference mode.
4. Range lamps - top: out of tolerance high. middle: within tolerance. bottom: out of tolerance low.
5. Soft key lamps - lit only when the function is available.
6. Soft keys - perform the function shown on the information display. Softkeys A, B, C, D.
7. Program keys - increment or decrement program number (1-9).
8. Zero key - zeros the numeric display.
9. Print key - sends the information on the numeric display to a printer or PC.
10. Motor keys - positions the tip of the Linear Encoder (50 and 100mm motor drive only).
11. Enter key - completes number entry and moves to the next selection.
12. Enter lamp - flashes, prompting you to press the enter key.
13. Setup key - selects the setup menu.
14. Setup lamp - lamp is on when in setup mode.
15. Escape key - aborts number entry and takes you back to the previous selection.
16. Numeric keys - to enter numeric information.
17. Program number display - shows number selected by program keys.

3.0 Getting Started

1. Connect the probe (Linear Encoder or Digital Probe) (see Digital Readout Installation Manual).

2. Switch the power ON.

3. The Digital Readout will run through a start-up routine. If the readout has not been connected to the probe before, you will see the following display:

Move the probe tip and the display will change to the following:

Press the 'zero' key and the display will change to the following.

The system is now ready to start measuring.

Note: To establish the actual position within the stroke of a Digital Probe, press "escape" in place of "zero" in the above sequence.

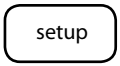
4.0 General

There are two modes of use ‘Operation’ and ‘Setup’. The Digital Readout will always be in the ‘Operation’ mode following power-up.

In ‘Operation’ mode the setup lamp is OFF.
In ‘Setup’ mode the setup lamp is ON.

To enter Setup mode.
First make sure that you are at the main ‘Operation’ menu (if not press escape key until you are).

Then press ‘setup’.

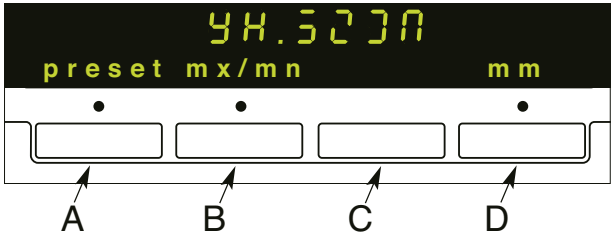


To enter operation mode
(main operation menu)
Press ‘setup’.

Note: These are the factory defaults. To show or hide operation menus refer to ‘show’ menu in Setup mode.

soft keys

Up to 4 menu items can be displayed at any one time. When the lamp above a key is lit it indicates that the function is available.



(Soft keys may be referred to as A, B, C & D)
Pressing the soft key results in an action taking place.

enter key

Used to:

- save numbers keyed in.
- save settings after they have changed.
- move to the next step in a menu sequence.

Enter lamp flashes prompting you to press enter key.

escape key

Used to:

revert to previous number entered or previous step in a menu sequence without saving changes.

setup key

Switches between Operation & Setup mode.

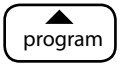
Note: Escape from preset, mx/mn or scan menus to main operation menu before pressing setup key.

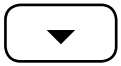
In Setup mode.

setup key can be pressed at any stage to revert to Operation mode (ensure you press enter first to save current change).

Programs
There are 10 programs allowing you to store up to 10 presets and 10 sets of limits. These can be used with a single probe (Linear Encoder or Digital Probe) or pair of probes for A+B or A-B measurements.

Alternatively each program can have a different probe (or probe pair) assigned to it, allowing up to 10 probes, (or probe pairs), to be connected to the Digital Readout. Each probe, (or probe pair), may have its own preset and limits. The program selected determines which probe has its reading displayed.

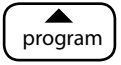
The 

and  keys are used to select the program. When the Digital Readout is switched on it automatically goes into the standard program for which there is no number displayed. The other 9 programs are numbered 1 to 9.

When moving from the Operation mode to the Setup mode and vice versa the Digital Readout reverts to the *standard program*.

Some of the setup menus are only available in the *standard program*, as the settings for these apply to the whole instrument and are not specific to individual programs.

For each program the resolution, direction and reference menus apply to the probe that is being used. If the same probe is used in more than one program these parameters will be changed on any of the programs which use this probe.

In addition to moving to the next or previous program, the 

and  keys behave like the enter key, saving a number or setting after it has been changed. This allows you to change a setting in one program and move to the next with one key press.

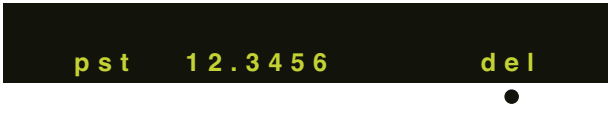
5.0 Operation Mode: Zero and mm/inch

Operation	Key stroke	Display
To zero the numeric display and establish an absolute datum. Press zero.	zero	
To Change between inches and mm proceed as follows.		
To select inch. Toggle to inch.	mm	
To select mm. Toggle to mm.	inch	

5.0 Operation Mode: Preset

DR600/ DR700

(Allows you to key in and load a preset in the standard program and switch between absolute and incremental datum.)
To key in and load a preset proceed as follows:

Operation	Key stroke	Display
To select preset. Press preset.	preset	
To key in a preset. (eg. 12.3456).	use numeric keys	
To save preset. Press enter.	enter	
To load preset into numeric display and establish preset datum (inc).	load	

Notes

1. 'inc' signifies that the Digital Readout is in the incremental mode and relates to the preset datum.
2. 'del' deletes the last character in the number entry.
3. Ensure you have the direction of count set correctly (see Setup dir menu).

5.0 Operation Mode: Preset *continued*

To switch between absolute and incremental datum.

Operation	Key stroke	Display
To switch to absolute datum. Toggle to abs.	inc	pst 12.3456 abs load
To switch to incremental datum. Toggle back to inc.	abs	pst 12.3456 inc load
To return to main operation menu.	escape	

5.0 Operation Mode: Maximum/Minimum

DR600/ DR700

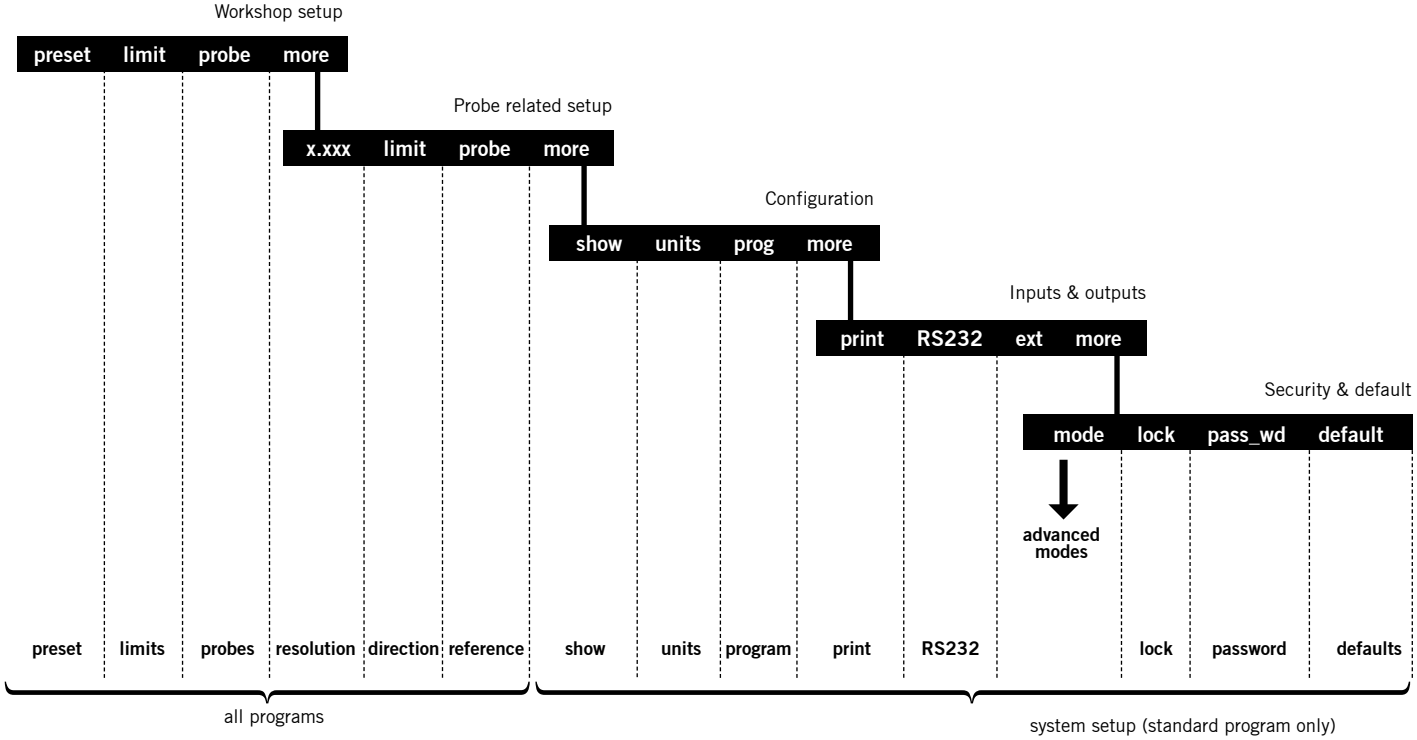
To use maximum/minimum with zero and preset datum proceed as follows:

Operation	Key stroke	Display
To establish zero datum. press zero. or **To establish preset datum.** (e.g. 28.000) key in and load preset using preset routine. Then escape.	zero	0.0000 preset mx/mn mm 28.0000 preset mx/mn mm
To select max/min. Press mx/mn.	mx/mn	4H.5C3N actual reset load
To clear the register. **IMPORTANT:** Do not press the reset key until you are ready to start taking readings.	reset	4H.5C3N actual reset load

5.0 Operation Mode: Max./Min. *continued*

Operation	Key stroke	Display
To view maximum Toggle to maximum.	actual	
To view minimum Toggle to minimum.	maximum	
To view difference Toggle to difference.	minimum	
To get ready for next test Toggle to actual. **Note:** To confirm zero datum press 'zero' key when 'actual' lamp is lit. or To confirm preset datum press 'load' when 'actual' lamp is lit. To return to main Operation menu.	difference escape	

6.0 Setup Mode: Menus



6.0 Setup Mode: Preset

DR600/ DR700

(Allows you to store presets for each of the ten programs and to copy and store presets from master components.)
To store a preset in the standard program proceed as follows:

Operation	Key stroke	Display
To select preset menu in Setup mode.	setup → preset	pst 0.0000 copy
To key in preset. (e.g. 12.3456).	use numeric keys	pst 12.3456 del
To store preset and return to Operation mode.	enter → setup	

Notes: 1. To load preset into numeric display and establish preset datum go to Operation mode preset or max/min menu and press load key.

2. To enter and store presets for programs 1 to 9 select required program number using program ▲ or ▼ keys and repeat above procedure.

6.0 Setup Mode: Preset *continued*

To copy a preset from a master component proceed as follows:

Operation	Key stroke	Display
To select preset menu in Setup mode.	setup, preset	pst copy
Establish datum press zero.	zero	pst 0.0000 copy
Measure part (e.g. 1.010).		pst 1.010 copy
To copy reading to preset.	copy	pst 1.010
To store a preset and return to Operation menu.	enter, setup	

6.0 Setup Mode: Preset *continued*

DR600/ DR700

To store and use presets for up to 10 programs with one probe (or pair of probes e.g. A+B) and one datum.

Operation	Key stroke	Display
To select preset menu in Setup mode.	setup, preset	
To key in preset (e.g. 0) for standard program.	use numeric keys	
To store preset and move to program 1.	program	
To key in preset (e.g. 1) for program 1.	use numeric keys	
To store preset and move to program 2.	program	

Continue as above for remaining programs.

6.0 Setup Mode: Preset *continued*

Operation	Key stroke	Display
To view presets in Operation mode.		
To return to Operation mode preset press setup and preset.	setup, preset	
Display shows preset value stored in the standard program.		
To view program 1 preset.		Prog 0.0000 abs load
To view program 2 preset.	program	Prog 1 1.0000 abs load
	program	Prog 2 .____ abs load

Operation	Key stroke	Display
To load a preset and establish preset datum. Select standard program.	program or	
Press load key.	load	
To view preset 1 and reading with respect to preset datum.	program	
To view other presets and readings with respect to preset datum.	program or	
To return to main Operation menu.	escape	

6.0 Setup Mode: Limits

DR600/ DR700

(Allows you to store limits to control the range lamps for each of the 10 programs. Upper and lower limits may be entered directly or by keying in the the nominal plus high and low tolerances. Limits may be copied from master components and range lamps can be enabled or inhibited.)
To store upper and lower limits and control whether range lamps are enabled or inhibited.

Operation	Key stroke	Display
To select limits menu.	setup → limit	limit nom+tol mx/mn
To enter upper and lower limits choose limit option.	load	hi limit = 0.0000 copy
To enter upper limit (e.g. 0.01).	use numeric keys	hi limit = 0.01 del
To store upper limit.	enter	lo limit = 0.0000 copy
To enter and store lower limit (e.g. –0.01).	use numeric keys → enter	range lamps on? no

6.0 Setup Mode: Limits *continued*

DR600/ DR700

Operation	Key stroke	Display
To turn range lamps on, Toggle to "yes" or **To turn range lamps off** Toggle to "no".	no ● / yes ●	range lamps on? yes ● / range lamps on? no ●
To complete. Press enter.	enter	preset ● limit ● probe ● more ●
To enter and store limits for programs 1 to 9. Select program number and repeat above procedure.	program ▲ or ▼	
To return to Operating mode.	● setup	

6.0 Setup Mode: Limits *continued*

To enter and store limits for the standard program using nominal and tolerance.

Operation	Key stroke	Display
To select nominal and tolerance method of entering limits. Enter nominal, then proceed as instructed.	setup → limit → nom+tol	nominal = 0.0000 copy

6.0 Setup Mode: Limits *continued*

DR600/ DR700

To copy the nominal from a master component.

Operation	Key stroke	Display
Select nominal + tolerance.	setup, limit, nom+tol	
Establish datum and press zero.	zero	
Measure part (e.g. 1.010).		
To copy reading to nominal.	copy	
To save nominal. Proceed as instructed.	enter	

6.0 Setup Mode: Limits *continued*

DR600/ DR700

To store upper, lower and difference limits for use in maximum/minimum Operation menu.

Operation	Key stroke	Display
To select maximum/ minimum/difference limits.	setup, limit, mx/mn	hi limit = 0.0000 copy
To enter upper limit. (e.g. 0.01).	use numeric keys	hi limit = 0.01 del
To store upper limit.	enter	lo limit = 0.0000 copy
To enter and store lower limit. (e.g. –0.01).	use numeric keys, enter	diff lmt = 0.0000
To enter and store difference limit. (e.g. 0.015). Proceed as instructed.	use numeric keys, enter	range lamps on? no

6.0 Setup Mode: Probes

DR600/ DR700

(Allows you to set up individual probes, pairs of probes (A + B or A – B); to assign probes to programs and to set up a group of probes that can be scanned.) On the DR700, refer to Scaling Factor for probe setup.
To select individual probe, A+B, A–B, or scan.

Operation	Key stroke	Display
To select probe menu.	setup → probe	use: individual probe
To set up a single probe. Toggle through choices to 'individual probe'.	scan	use: individual probe
To set up 2 probes in an A + B configuration. Toggle to 'A + B'.	individual probe	use: A + B
To set up 2 probes in an A – B configuration. Toggle to 'A – B'.	A+B	use: A – B
To setup, up to 30 probes to be scanned. Toggle to "scan".	A–B	use: scan

6.0 Setup Mode: Probes *continued*

DR600/ DR700

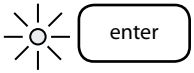
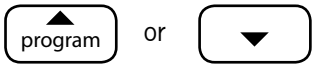
To install a new probe for use with all programs.

Operation	Key stroke	Display
Select 'individual probe' as previous page.		
To identify current probe.	enter	
To specify a new probe. Select "new".	new move probe tip	
To use this probe with all programs. Toggle to "yes" **Note:-** This option is only available in the standard program.	no	
To complete.	enter ● setup	

Note: Procedure for A+B and A–B configurations is similar to the above.

6.0 Setup Mode: Probes *continued*

To install different probes for use in each program.

Operation	Key stroke	Display
To install first probe in standard program. Proceed as for last section until prompted to press probe tip.	move probe tip	
Press enter key (i.e. do not copy to all programs).		
Select program number 1 to 9 and repeat above procedure.		
Procedure for A+B and A–B configuration is similar to the above.		

6.0 Setup Mode: Probes *continued*

To scan through a group of probes.

Operation	Key stroke	Display
Select ‘scan’ from Probe ‘use’ choices.		use: scan
To select number of probes to be scanned.	enter	scan probes : 30
Select number (e.g. 10).	use numeric keys enter	
Select ‘new’ and proceed as instructed to select remaining probes.		

6.0 Setup Mode: Probes *continued*

To use scan in Operation mode.

Operation	Key stroke	Display
To return to Operation mode. Press setup.	setup	
To select scan and view probe 1 reading. Press scan.	scan	
To view probe 2 reading. Toggle to scan probe 2 or Key in '2' and press enter.	scan probe 1	
	use numeric keys enter	
To return to main Operation menu.	escape	

6.0 Setup mode: Resolution

DR600/ DR700

To change the displayed resolution for a probe.

Operation	Key stroke	Display
To select resolution menu.	setup → more → x.xxx	
To decrease number of full decades displayed.	less	
To increase decades displayed.	more	
To select resolution of 1, 2 or 5 in the last decade. Toggle to 1, 2 or 5 as required.	enter	
To complete and return to Operation mode.	enter → setup	

Note: When full resolution of probe has been reached more choice will disappear and only valid step sizes will be available.

6.0 Setup mode: Direction

DR600/ DR700

To change the direction of count.

Operation	Key stroke	Display
To select direction menu.	setup → more → dir	direction: retract = +
For increasing count as probe extends toggle to 'extend=+'.	retract = +	direction: extend = +
For increasing count as probe retracts toggle to 'retract=+'.	extend = +	direction: retract = +
To complete and return to Operation mode.	enter → setup	

6.0 Setup Mode: Reference Mark

DR600/ DR700

Uses reference marker on the Linear Encoder to establish reference datum.

Operation	Key stroke	Display
To select reference menu.	setup → more → ref	ref mode: off
To turn reference mode on. Toggle to 'on'. In this mode Linear Encoder tip must be moved so that reference marker is passed each time Readout is powered up.	off	ref mode: on
To select reference datum. Press 'enter' and select 'new'.	enter → new	set machine datum
Establish machine datum. Press 'enter'.	enter	datum: ■■.■■■

6.0 Setup Mode: Reference Mark *continued*

DR600/ DR700

Operation	Key stroke	Display
For zero datum key in 0 or For a preset datum (eg 10.5) key in 10.5.	Key in 0 Use numeric keys	datum = 0 del ● datum = 10.5 del ●
Press 'enter'.	 enter	move thru ref mark

Move tip until display counts.

Note: Reference lamp is on when in reference mode.

6.0 Setup Mode: Reference Mark *continued*

To Recall reference mark.

Operation	Key stroke	Display
Recall after power down. Power on.		move thru ref mark
Move tip until display counts.		
Recall reference mark with unit powered up.		
To select reference menu.	setup → more → ref	ref mode : on
Press 'enter' and 'recall'.	enter → recall	move thru ref mark
Move tip until display counts.		

6.0 Setup Mode: Reference Mark *continued*

DR600/ DR700

To switch off reference mode.

Operation	Key stroke	Display
To select reference menu.	setup → more → ref	ref mode : on
Toggle to 'off'.	on	ref mode : on
To complete and return to Operation mode.	enter → setup	press zero to continue

To show or hide operation menus.

Operation	Key stroke	Display
To select show menu.	setup → more → more → show	show preset ? yes
Toggle to 'yes' to show the menu in Operation mode.	no	show preset ? yes
Toggle to 'no' to hide the menu.	yes	show preset ? no
Press 'enter' to save the change and move onto the next selection.	enter	
Proceed as instructed.		

Note: To show 'scan' in Operation menu first install probes to be scanned using setup probe menu.

6.0 Setup Mode: Reference *continued*

(Allows you to select inches or mm's, to show or hide the units in operation mode and to enable the units shown in operation mode to be changed.)

Operation	Key stroke	Display
To select units menu.	setup → more → more → units	units of measure : mm

Proceed as instructed.

6.0 Setup Mode: External

DR600/ DR700

To freeze display with external signal or RS232 CTRL B character.

Operation	Key stroke	Display
To select external menu.	setup → more → more → ext	freeze: no freeze
To freeze on RS232 command. Toggle to 'RS232'.	no freeze	freeze: RS232
To freeze on negative edge of external signal. Toggle to 'remote neg edge'.	RS232	freeze: remote neg edge
To freeze when remote signal is low. Toggle to 'remote low'.	remote neg edge	freeze: remote low
To switch off freeze facility. Toggle to 'no freeze'.	remote low	freeze: no freeze
To complete and return to Operation mode.	enter → setup	

Note: See DR600 Installation Manual for electrical specification and timing for remote signals.

6.0 Setup Mode: Print

DR600/ DR700

(Determines what information is sent to a printer or PC when the print key is pressed or a send measurement command is received on the RS 232 interface, in operation mode.)
To configure print options.

Operation	Key stroke	Display
To select print menu.	setup → more → more → more → print	blank lines: 0
To key in number of blank lines on print out e.g. 5.	Use numeric keys	blank lines: 5 del
Press enter.	enter	print program no. ? no
To print the program number. Toggle to 'yes'	no → yes	print program no. ? yes
or **To print reading without program number.** Toggle to 'no'.		print program no. ? no
Press enter.	enter	print: this reading

6.0 Setup Mode: Print *continued*

Operation	Key stroke	Display
To print the current reading only. Toggle through choices to 'this reading'.	all readings ●	print: this reading ●
To print the reading and move onto next selection. Toggle through choices to 'reading then step' (see Note 1 on following page).	this reading ●	print: reading then step ●
To print all readings. Toggle through choices to 'all readings' (see Note 2 on following page).	reading then step ●	print: all readings ●
To complete & return to Operation mode.	 enter ● setup	

Note1:
When max/min menu is selected in Operation mode, displayed reading (e.g. maximum) is printed then next reading (e.g. minimum) is displayed. When 'scan' menu is selected in Operation mode displayed reading (e.g. scan 5) is printed then reading for next probe (e.g. scan 6) is displayed.
If max/min or scan are not selected, reading for current program (e.g. prog 2) is printed then reading for next program (e.g. prog 3) is displayed.

Note 2:
When max/min menu is selected maximum, minimum and difference readings are all printed.
When scan menu is selected readings for all scanned probes are printed. If max/min and scan are not selected, readings for all programs are printed.

6.0 Setup Mode: RS232 & Program

DR600/ DR700

RS232: To configure RS232 serial port for connection to a printer or PC.

Operation	Key stroke	Display
To select RS232:	setup → more → more → more → RS232	baud rate: 9600
Proceed as instructed.		

Program: To select the number of programs required and whether to return to the standard program each time setup is pressed.

Operation	Key stroke	Display
To select program.	setup → more → more → prog	last program no: 9
To change number of programs key in last program number e.g. 5 (must be in range 1 to 9).	Use numeric keys	last program no: 5 del

Operation	Key stroke	Display
To select whether to return to the standard program each time setup **is pressed**	 enter	default to std prog ? yes
Select **yes** or **no** as appropriate		
To save settings and return to operation mode.	 enter setup	

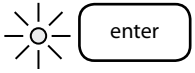
6.0 Setup Mode: Lock

DR600/ DR700

(Allows you to lock individual Operation mode keys and Setup menus. Locked keys and menus may only be accessed when correct password has been entered. Lock, password and default menus are always locked until correct password has been entered.)

Operation	Key stroke	Display
To enter password. Press setup and key in password (factory default is 0000).	setup — Use numeric keys	password: 0000 del
Press 'enter'.	enter	
To select lock menu. Select 'yes' for lock to become live when setup key is pressed to go back to Operation mode.	more ● more ● more ● more ● lock ●	lock active? yes ●

6.0 Setup Mode: Lock *continued*

Operation	Key stroke	Display
Toggle to 'no' if you wish to move between setup mode and Operation mode without activating locked keys and menus (note: locks are always active after power up).		
Press 'enter'.		
Select 'operate' to lock or unlock Operation mode keys; or 'setup' to lock or unlock setup menus.		
Proceed as instructed.		

6.0 Setup Mode: Password

DR600/ DR700

To change the password.

Operation	Key stroke	Display
To enter existing password Press setup and key in password (factory default is 0000).	setup **use numeric keys** enter	
Select password menu	more more more more pass_wd	change password? no
Toggle to 'yes'.	no	change password? yes
Press enter.	enter	new password: del
Key in new password (e.g. 9999).	Use numeric keys	new password: 9999 del
To complete.	enter setup	

6.0 Setup Mode: Default

DR600/ DR700

To recall factory defaults.

Operation	Key stroke	Display
To enter password Press setup and key in password (factory default is 0000).	setup → Use numeric keys → enter	
To select default.	more → more → more → more → default	recall → new
Select recall.	recall	clear all settings? → no
Proceed as instructed.		

Note: 'New' option above overwrites factory default settings with the current settings. An additional security code is required to use this option. Consult your Solartron dealer for further information.

Introduction to Scaling Factor

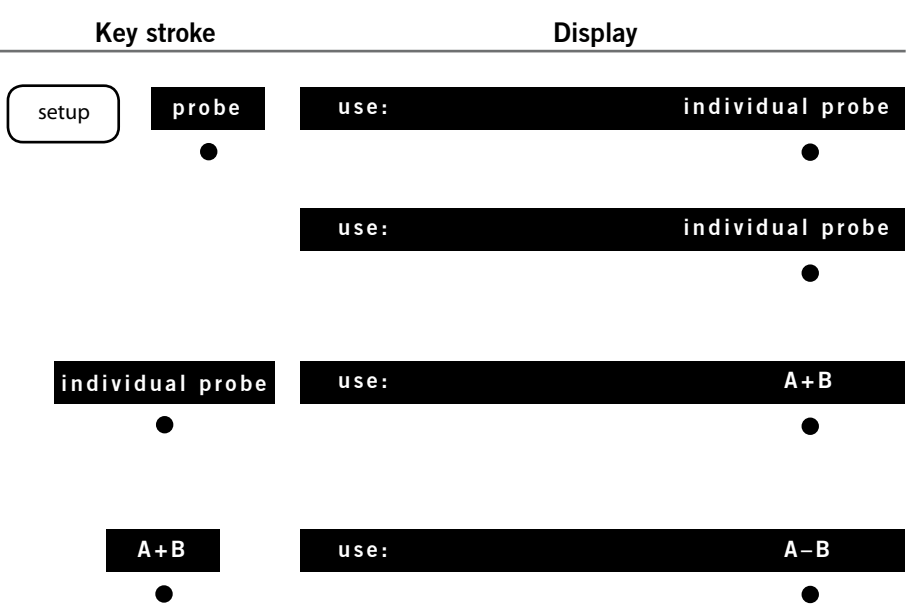
Scaling Factor enables a factor (or multiplier) to be applied to the displayed measurement of the DR700. Factors that can be applied range from + 0.01 to + 100.0 or – 0.01 to – 100.0.

The scaling factor is applied individually for each program (standard or 1 to 9) and will scale the output of that program for any mode selected, Individual Probe, A + B, A – B. For A + B and A – B modes, scaling can be the same for A and B or separate for A and B.

All DR700 programmes default to a standard scaling factor of 1.000 for A and B.

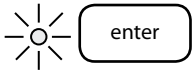
6.0 Setup Mode: Scaling Factor *continued*

Setup of Scaling Factor Mode.

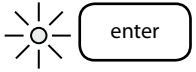
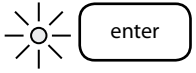
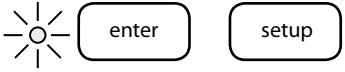


6.0 Setup Mode: Scaling Factor *continued*

Single probe application
The following example shows you how to install a single Digital Probe or Linear Encoder with a scaling factor of x2.

Operation	Key stroke	Display
Select 'individual probe' as previous page		use: individual probe ●
To identify current probe		id = xxxxxxxx new ●
To specify a new probe. Select 'new'.	new ●	move probe tip *
	Move probe tip	id = xxxxxxxx
To change scale of the probe. Toggle to 'yes'.	no ●	change scale?: no ●

6.0 Setup Mode: Scaling Factor *continued*

Operation	Key stroke	Display
		Scale: 1.0000 auto
Use key pad to manually enter a Scaling factor (+0.01 to +100.0 or –0.01 to –100.0)	For example 2.0 	Scale: 2.0 auto
To use this probe setting with all programs. Toggle to 'yes'. (This option only appears if in Std Program)	(Copies this id and this scaling factor to all programs)	Copy to all progs no Copy to all progs yes
To complete		

A + B or A – B probe application
For a dual probe application in the case of A + B and A – B, follow the Setup of Scaling Factor Mode and select either A + B or A – B.

Auto Scaling
If you do not know the scaling factor to be added to the probe, the DR700 has an Auto Scaling option.

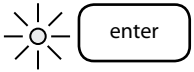
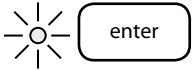
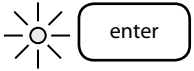
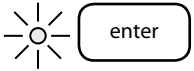
Auto Scaling with a Single probe
The following example shows you how to install a single Digital Probe or Linear Encoder and auto calculate a scaling factor from two datum positions.

Follow the procedure for selecting an 'Individual probe'.

Operation	Key stroke	Display
Select 'individual probe'.		use individual probe

6.0 Setup Mode: Scaling Factor *continued*

Operation	Key stroke	Display
To identify current probe	enter	id = xxxxxxxxx new
To specify a new probe. Select 'new'.	new	move probe tip *
	Move probe tip	id = xxxxxxxxx
To change scale of the probe. Toggle to 'yes'.	no	change scale ? no
	enter	scale: 1.0000 auto
To select auto scaling	auto	scale: 1.000 auto
Position probe at datum 1.	enter	set datum 1

Operation	Key stroke	Display
Manually enter required display value for datum 1	For example 2.00	Datum 1: 2.000
Position probe at datum 2.		●
		Set datum 2
Manually enter required display value for datum 2	For example 5.00	Datum 2: 5.000
		
The scaling factor will be calculated and automatically displayed		Scale: x.xxxxx auto
		●
If the scaling factor, which has been calculated, is out of scaling range +0.01 to +100.0 or –0.01 to –100.0 an error will be displayed. If the probe movement between datum 1 and datum 2 is to small, an error will be displayed.		scale factor error
		range diff to small
		Copy to all progs no

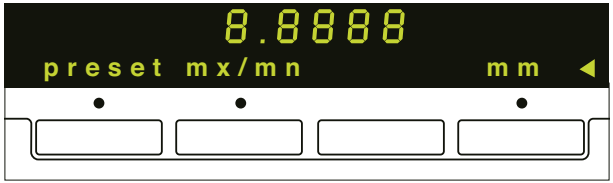
Operation	Key stroke	Display
To use this probe setting with all programs. Toggle to 'yes'. (This option only appears if in Std Program).	(Copies this ID to all programs and this scale factor to all programs)	copy to all progs yes ●
To complete	 enter setup	

Auto Scaling with in A + B or A – B.
If you do not know the scaling factor to be added to the probe in a dual probe application in the case of A + B and A – B, follow the Setup of Auto Scaling with a Single Probe Mode and select either A + B or A – B.

Continue to follow the procedure, then the DR700 will request "scale A and B same? no/yes", answer accordingly, and then follow the displayed instructions.

Scaling Factor Indication

If a scaling factor is changed to a value other than 1.000, then a visual indication ◀ is given on the last alphanumeric character.



If required the scaling indication can be suppressed

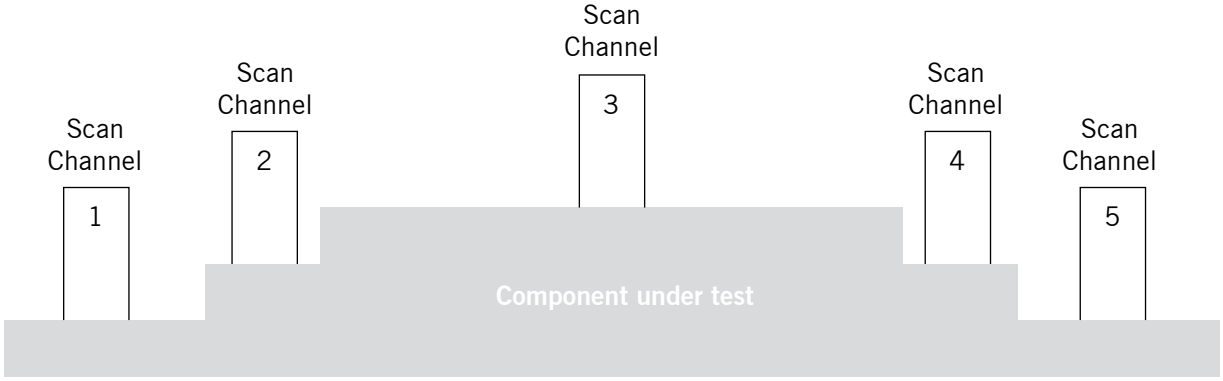
Operation	Key stroke	Display
Select the 'show' menu.	setup → more → more → show	show units prog more
Press enter until 'show scaling?' is displayed.	enter	show scaling? yes

Operation	Key stroke	Display
Toggle SoftKey D to show 'no'	yes	show scaling? yes
	enter	
To complete the sequence	setup	

If you wish to clear the scaling factor from any program, set its scaling factor to 1.000.

Introduction to Gauging Mode

- Global Pass/Fail evaluation on up to 30 scan channels (using range lamps).
- Each scan channel has it's own Limits and Pre-sets
- Each channel can be a single probe, A + B or A – B
- Can be set up for 1 to 30 scan channels. (Maximum of 30 probes)

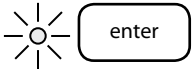


6.0 Setup Mode: Gauging Mode *continued*

Selecting and Setup of Gauging Mode

Operation	Key stroke	Display
To select mode.	setup → more → more → more → more	**mode** passed lock default
To select Advanced mode. Toggle to advanced using soft key D	mode → standard	mode standard
To enter mode	enter	
To select Gauging mode. Toggle to gauging using soft key D	gauging	mode gauging
To enter mode.	enter	

Setup of Gauging Mode Parameters

Operation	Key stroke	Display
Select number of Scan Channels	Use numeric keys	scan channels: 30
To store number of Scan Channels		scan channels: 30 del
To set up each probe	Refer to page 24 and 25 This procedure is used for each scan channel	scan xx individual probe
Set search delay, in seconds. (The length of time each out of limits channel will be shown if search function is used)	1, 2, 3, 4, 5 toggle (Using Soft Key D)	search delay 2sec

Operation	Key stroke	Display
To store search delay and complete setting of Gauging Mode	 enter setup	press zero to continue

Pressing the zero key, will set all the gauging probes to zero, and automatically enter into the main gauging mode display.

To establish the actual position within the stroke of the probes connected, by pressing the escape key will set all the gauging probes to nominal.

Note: Zero will give an error message if all probes selected are not in range, they will automatically be set to nominal.

Operation of Gauging Mode

Segment rotates to indicate scanning in progress

Functions

Scan	This halts the scan and displays the first scan channel. This is known as Static Mode.
Search	Searches and displays the channels, which are out of limits. (Pin 6 on Input/Output connector simulates key press).
Load	Loads the preset value for all scan channels.
Zero	Zero all scan channels.

Function	Display	Soft key	
Scan	Scan X	A	Where X is the scan channel number. Pressing the key again will advance onto the next scan channel.
	End	D	Ends the Static Mode and reverts to scan mode.
Search		C	If all scan channels are within the limits the display will show 'no faults found'. Otherwise the display will show the failing channel for the selected time. (Refer to page 59. Setting Up Gauging Mode.) At the end of the search Scan Mode will re start automatically.

Hi and Low Limits
Each scan channel has it own high and low limits (follow the procedure on page 19). Each channel is numbered, and is labelled **scan X** (Where X is the scan channel number), to identify which channel is being set.

Presets
To set the presets follow the procedure on page 14 of this manual.

Again each channel is numbered, and is labelled Scan X (Where X is the scan channel number), to identify which channel is being set.

Gauging Mode Print Options

Set the print up in the same way as described on page 38. The print options are as follows:

Function	Description
This reading	If in scan mode no print will occur. If in static mode, the current scan channel prints.
Reading then step	If in scan mode, this changes to static mode and prints the first channel. Each press of print will advance to the next scan channel and prints. After printing all channels, it will loop back to the first channel.
All readings	In scan mode, scanning is temporarily suspended, all scan channels are printed and scanning is then resumed. In static mode all scan channels are printed and the display reverts to the scan channel that was displayed before the printing process.

6.0 Setup Mode: Max A + Max B

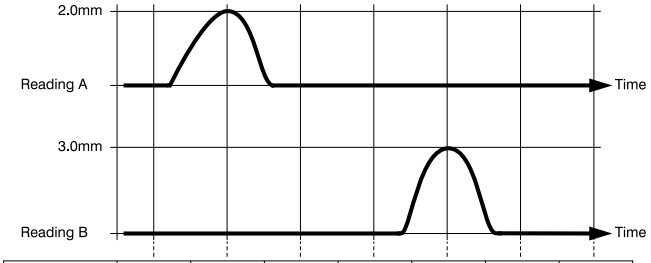
Introduction to Max A + Max B

In Standard Mode on the DR600 and 700, the unit can be configured to read two probes and provide a Maximum A + Maximum B function.

The display is updated every 70ms, and displays the Maximum A plus Maximum B reading.

Max A + Max B will display the maximum reading seen by probe 1 and the maximum reading seen by probe 2 and add them together. (Maximum are updated within the probes every 4ms.)

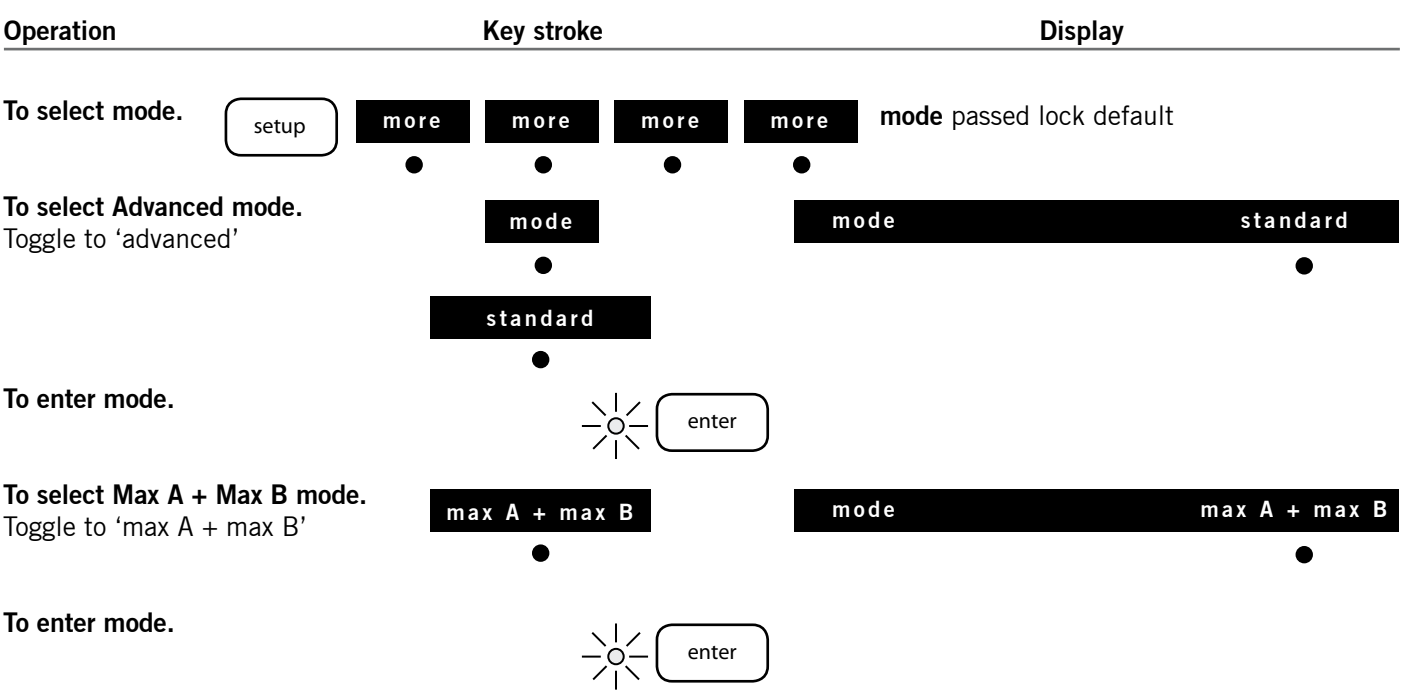
Also in Max A + Max B the Digital Readout enables you also to display Maximum A reading, Maximum B reading and for helping to set the probes up, the raw reading from A or B.



Function	1	2	3	4	5	6	7
DR600/700 Max/Min Mode Max(A+B)	0.0mm	2.0mm	2.0mm	2.0mm	3.0mm	3.0mm	3.0mm
DR700 Max A + Max B	0.0mm	2.0mm	2.0mm	2.0mm	5.0mm	5.0mm	5.0mm

6.0 Setup Mode: Max A + Max B *continued*

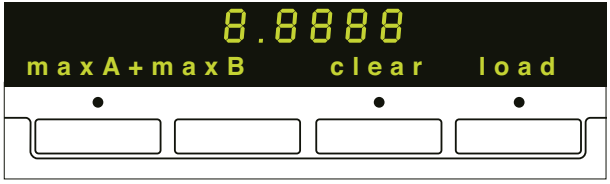
Selecting and Setup of Max A + Max B Mode



Selecting and Setup of Max A + Max B Mode

Operation	Key stroke	Display
Set up probe A	Refer to page 24 and 25	
Set up probe B	Refer to page 24 and 25	
To complete setting of Max A + Max B	 enter setup	

Operation of Max A + Max B



Max A + Max B Mode Print Options

Set the print up in the same way as described on page 38. The print options are as follows:

Print Option	Description
This reading	Prints the current display. Print the current display and advances to the next display.
Reading then step	Cycles Max A + Max B Max A Max B Raw A Raw B
All readings	Prints the output for all the display options in one operation.

Function	Display	Soft key	
Max A + max B	max A + max B	A	Shows the Maximum of probe A added to Maximum of probe B
	Clear	C	Resets maximum reading in the probes to current probe position for both A and B
	Zero		Sets max A+ max B result to zero
Max A	Load	D	Loads the current pre-set value onto the display
	Max A	A	Display shows the maximum A reading
	Clear	C	Resets maximum reading in probe A to current probe position
Max B	Zero		Sets max A result to zero
	Max B	A	Display shows the maximum B reading
	Clear	C	Resets maximum reading in probe B to current probe position
A	Zero		Sets max B result to zero
B	A	A	Actual probe reading, with no offset or pre-set applied
	B	A	Actual probe reading, with no offset or pre-set applied

The following I/O connector pins can be used for remote control.
pin 3 – Load pin 5 – Clear pin 6 – Softkey A (Display Type)

Introduction to Autosense

Autosense Mode is designed to enable the automatic selection of a program, when the tool associated with that program is used.

This mode is intended for application where only one tool is in use any one time. Each tool must use a unique probe (or probes). A total of 9 tools can be used, from 1 to 9 will be associated with Programs 1 to 9.

When there are no tools in the working range the alphanumeric display shows **autosense: all tools** parked and the numeric display and program number display are blank.

When the tool read enters the **working range** the tool becomes active and the program for that tool is automatically invoked, along with it's limits, presets etc. The working range for each program is defined by a Range High Limit and Range Low Limit.

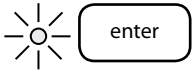
Once a program is active it's operation is the same as Standard Mode. When the tool leaves the **working range** the unit will revert to all tools parked until another tool is used.

6.0 Setup Mode: Autosense Mode *continued*

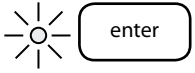
Selecting and Setup of Autosense Mode

Operation	Key stroke	Display
To select mode.	setup → more → more → more → more	**mode** passed lock default
To select Advanced mode. Toggle to 'advanced'	mode	mode standard
	standard	
To enter mode.	enter	
To select Max A + Max B mode. Toggle to 'autosense'	autosense	mode autosense
To enter mode.	enter	

Set up of Autosense Parameters

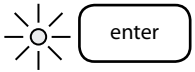
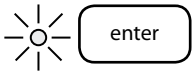
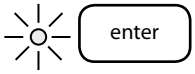
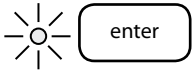
Operation	Key stroke	Display
Define the number of tools which are tool be used. Enter value by numeric pad	**Enter value** (1 to 9) 	no of tools: ●

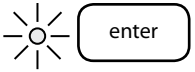
The following sequence will follow for the number of tools entered. (The tool number will be displayed in the Program Display)

Select 'individual probe', 'A + B' or 'A – B'	individual probe ● 	probe individual probe ●

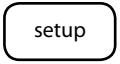
6.0 Setup Mode: Autosense Mode *continued*

Operation	Key stroke	Display
Define the number of tools which are tool be used. Enter value by numeric pad	Enter value (1 to 9)	`no of tools: X`
	enter	●
	enter	`id = xxxxxxxxxx new`
To identify current probe or		●
To specify a new probe. Select 'new'.	`new`	
	●	Move probe tip
	Move probe tip	`id = xxxxxxxxxx`
Choose direction of detection retract=+ or extend=+	`retract = +`	`direction: retract = +`
	●	●
	enter	

Operation	Key stroke	Display
Re-master part zero, preset or accept current value	accept current value 	re-master zero preset ● ●
Enter Hi Range value	numerical key pad 	hi range: 5.0000
Enter Lo Range value	numerical key pad 	lo range: 2.0000
Select program entry menu (operate, preset, max/min actual, max/min max, max/min min, max/min diff) This allows you to choose which menu level is shown on entry to the programme.	operate ● using soft key D 	prog entry menu: operate ●

Operation	Key stroke	Display
		

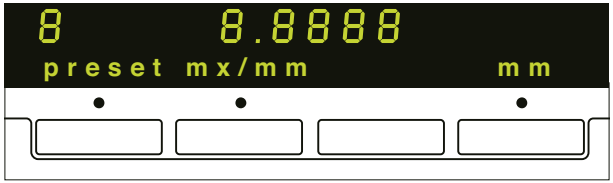
Once all information for each tool has been entered, to start the Autosense Mode



Operation of Autosense Mode

After settting up Autosense Mode then each tool will have had it's work range set. With all tools parked, there will be the following display.

When a probe reading is within its defined working range, the display will show the selected tool.



The Alpha Numeric display will depend upon the menu level option selected in the setup.

Note that the working range only defines the region in which the tool is active. Limits for the tool work range can be adjusted in the Limit menu.

Autosense Mode Print Options
Set the print up in the same way as described on page 38. The print options are as follows:

Print Option	Description
This reading	Prints output of current tool in use.
Reading then step	Not applicable in autosense, as program selection is by tool use.
All readings	Prints output of all tools.

Introduction to Peak Mode

When the DR700 is in Peak Mode, the unit is designed to take a number of manually triggered peak (maximum) readings, from a single probe (Digital Probe or Linear Encoder) and then analyse and display a calculated result in the form of the following displays.

Point(Max) : Maximum Peak value recorded
Point(Min) : Minimum Peak value recorded
Point(Range) : Peak(Max) - Peak(Min)
Point(Avg) : Sum of all points / No of points

The manual trigger will be available via Soft Key D **<store>** or an external logic input. (Input / Output connector Pin 3.) Refer to the Installation manual of the DR600/700

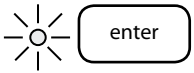
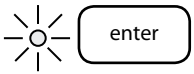
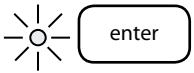
6.0 Setup Mode: Peak Mode *continued*

Selecting and Setup of Peak Mode

Operation	Key stroke	Display
To select mode	setup → more → more → more → more	**mode** passed lock default
To select Advanced mode. Toggle to 'advanced'	mode → standard	mode standard
To enter mode	enter	
To select peak mode. Toggle to peak	peak	mode peak
To enter mode	enter	

6.0 Setup Mode: Peak Mode *continued*

Setup of Peak Mode Parameters

Operation	Key stroke	Display
Enter the number of readings to be taken.	**Enter value** Enter value by numeric (2 to 99)	no of points: X
		
'individual probe' is selected [In this mode A+B and A–B are not available. Shown for confirmation only]	individual probe	probe = : individual probe
		
To identify current probe or		id = xxxxxxxxxx new
To specify a new probe. Select 'new'.	new	Move probe tip *

Operation	Key stroke	Display
	Move probe tip	id = xxxxxxxxxx
Choose probe direction retract=+ or extend=+	retract = +	direction: retract = +
	enter	re-master zero preset
Re-master part. Zero, preset or press enter to accept current value	**accept current value** enter	
		mode passwd lock default
Setup is now complete.	setup	

6.0 Setup Mode: Peak Mode *continued*

Operation of Peak Mode

This example shows you the steps in operation of Peak Mode.

The example shows Peak Mode to take 4 readings.

Operation	Key stroke	Display
Display after setup or after 'new' pressed		
To start a new sequence. The display shows a live reading of the probes maximum	start	
To take reading 1 Reading 1 is stored	store	

Operation	Key stroke	Display
To take reading 2	start	3.3333 point 3/4 new store
To take reading 3	store	4.4444 point 4/4 new store
To take reading 4	store	

All readings are know have been taken and stored in the unit.

At any point in the above sequence, pressing the **[escape]** key will take you back one step.

Pressing the Softkey C **<new>** will start the sequence again and delete and reading stored in the memory of the unit.

Note: I/O Connector pin 3 simulates softkey D (start, store).

6.0 Setup Mode: Peak Mode *continued*

Example Operation of Peak Mode
After all reading are stored, the analysis is performed and peak (average) is displayed.

Operation	Key stroke	Display
After reading are stored		
Display point(max)	point (avg)	
Display point(min)	point (max)	
Display point(range)	point (min)	

Pressing the SoftKey A again will cycle through the four result modes.

Pressing <new> Softkey C will initiate a new cycle of samples.

Peak Mode Print Options
Set the print up in the same way as describes on pages 38. The print options are as follows:

During the acquisition phase (Point 1 to Point N) pressing [print] will cause the Peak Reading to be printed “Pnt 1 0.1234” (Only available for print: this reading mode).

With the display in one of four Peak Analysis Formats, pressing print will cause an action dependant on the print setup.

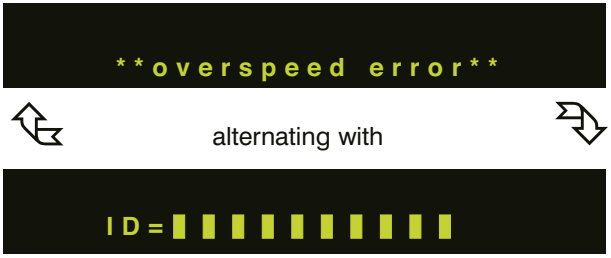
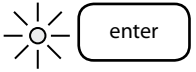
Print Option	Description
This reading	Pnt Avg 0.2777 Pnt Max 0.4444 Pnt Min 0.1111 Pnt Rng 0.3333
Reading then step	Not available in autosense, as program selection is by tool use.

Print Option	Description
All readings	Pnt 1 0.1111 Pnt 2 0.2222 Pnt 3 0.3333 Pnt 4 0.4444 Pnt Avg 0.2777 Pnt Max 0.4444 Pnt Min 0.1111 Pnt Rng 0.3333

7.0 Errors

Display	Error	Action
	Digital Probe over range.	Reposition probe within measuring range.
	Digital Probe under range.	Reposition probe within measuring range.
	Displayed number outside allowable range. (±999.999 99mm or 39.370078 inch). Or invalid (max/min mode) after probe travels out of range.	Use smaller preset value.

7.0 Errors *continued*

Display	Error	Action
	Probe not connected	Switch off unit. Connect probe.
	Probe has been changed	Select ‘new’, then proceed. as instructed.
	Overspeed error (Tip of Linear Encoder has been moved too fast).	 Then proceed as instructed.

Display	Error	Action
	Probe fault.	Record error code. Consult your Solartron Dealer.

8.0 Specification

Numeric Display	9 digit LED display with polarity and decimal point.				
Display Length	±999.999 99mm or ±39.370078 inches. Automatic suppression of redundant leading zero's.				
Maximum	with Linear Encoder		0.05µm or 2 millionths inch		
Resolution	with Digital Probe:	DP1	0.05µm or 2 millionths inch	DP5	0.5µm or 20 millionths inch
		DP2	0.1µm or 5 millionths inch	DP10	0.5µm or 20 millionths inch
Range Lamps	Indicate Hi/OK/Lo for limit detection.				
Functions commanded through front panel					
Zero	Single key operation to zero reading on display.				
Print	Readings sent to printer or PC via the RS232C interface (Baud rate selectable 300 to 57,600)				
Motor Drive	Control of UP/DOWN for motor driven probes				
Program select	10 different programs available. Each program may have its own preset, limits and probes, or pair of probes (A+B or A-B)				
Units	Choice of mm or inches				
Preset	10 memories enable 10 different preset values to be stored.				
	Soft Keys enable direct toggle between incremental and absolute datum.				
Maximum/Minimum	Stores and displays maximum, minimum and difference values				
Limits/Tolerance	High and Lo limit values, indication by range lamps. Outputs from the back panel permit control of relays for sorting components. 10 sets of limits can be stored.				
Multiple Probes	Up to 10 probes or pairs of probes (A+B or A-B) can be assigned to different programs. Each probe can have its own Preset, Limits, Resolution and Direction.				
Probe Scan	Up to 30 probes, sharing the same preset limits etc. can be scanned. (600 only)				
Mathematics	Two probes may be used in an A+B or A-B configuration.				
Resolution	Choice of 0.01µm, 0.1µm, 1µm, 10µm, 100µm or 1, 10, 100, 1000, 10,000 millionths of an inch.				
	Choice of 1, 2, 5 steps in least significant decade.				
	Note: Automatic inhibit of excessive resolution for probe in use				
Count Direction	Increasing count can be assigned to retraction or extension of probe tip.				
Reference Mark	The reference mark enables a datum to be re-established, e.g. following a power down.				
Display Freeze	External initiation of measurement and display freeze.				
Lock	Password protection may be applied to any permutation of keys or features.				