SD Systems

SDS-50

Operator Manual

Two-wire and direct relay

Irrigation Controller

- Program running
- Pumps
- Two-wire
- Fault

Two-wire Device Program port

1	2	3	AM PM COPY	BACK
4	5	6	ON/OFF SHORT CUT	
7	8	9	0	ENTER

2-wire Reflex

Patented   Technology

SDS-50

Made in Australia

DataCoil

Data   Node

Pump   Node
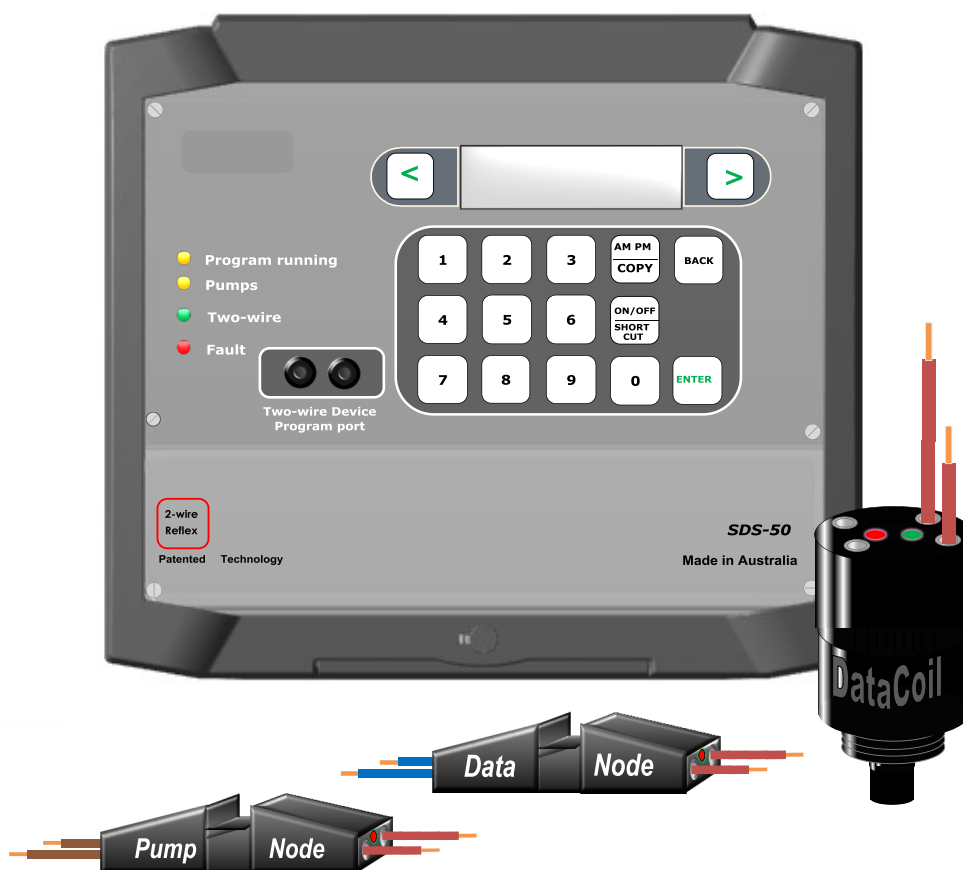
V1.7 2012

Thank you for purchasing the SDS-50 Two-wire irrigation controller.

The controller is designed for the most simplistic of programs up to complex requirements for both landscape and agriculture. The design makes servicing possible for the owner operator with easily accessible replacement plug-in electronic modules.

The SDS-50 controller has a capacity to operate 48 solenoid valves from a central location via a twisted pair cable. 12 programmable DataNodes™ facilitate the connection of sensors along the two-wire cable with an additional 6 controller direct inputs on the controller terminal. Up to two 24 direct relay output module can be connected at any location on the two-wire cable for conventional 24VAC solenoid operation.

With the SDS-50 controller there is no need for valve decoders. Simply connect the cable direct to the SD Systems DataCoil™. The SD-Systems, Bermad DataValves™ are supplied with DataCoils™ fitted. DataValves™ are available in sizes 25mm through to 150mm.

Data radio, GSM, 3G, Bluetooth and internet communication options are supported to enable remote programming and monitoring from any location. Central PC software and an advanced Android App are available at no charge.

This economically priced model is not compromised on quality and offers a capability not normally found on competing products many times its price.

Made in Australia

The SDS-50 controller is designed to operate on low voltage 36VDC. Use only the power supply included with the controller.

The power supply must be installed to comply with local electrical codes.

Prior to digging or trenching check with your local utilities for any underground services.

Wear protective and insulated footwear when working with electrical equipment.

Controller is packaged complete with the following items:

1 only SDS-50 irrigation two-wire controller

1 only 36VDC switching power supply

1 only pump start node (addressed as no. 49)

1 only SD-SP surge arrestor (some versions only)

1 set of plug-in alligator leads for TW-device programming

1 only instruction book

1 only PC programming software (some models only)

1 only mounting template

Disclaimer: As there may be misprints or omissions in this instruction book due to human error, or changes to product specifications, we therefore reserve the right to make changes to product descriptions and specifications without notice.

Signal Data Systems

Çon't

Menu path of the SDS-50 controller

Menu path of the SDS-50 controller

Controller keypad

Scroll menus and options
—
Scroll settings in menus

Change am/pm
—
Copy run times to stations

Welcome SDS-50
T.W. controller

Go back to previous entry or menu

Stop running programs, valves and stations.
—
Select various options in menus.
—
Turn off Red LED fault indicator

1	2	3	AM PM / COPY	BACK
4	5	6	ON/OFF / SHORT CUT	
7	8	9	0	ENTER

Enter data into the program.
—
Enter through menus.

Numeric entry keys
—
Display programs running

Display programs status

- 48 Stations. 48 DataValve™ capacity, and/or direct relay output modules (24)

    - **DataValves™ are available in two models, (S) Standard and (E) Extend.**

    - **(S) will operate four valves at once inclusive of a master valve.**

    - **(E) will operate 6 valves at once inclusive of a master valve.**

- 8 Independent programs.

- 12 Programmable field DataNodes™ connect directly to the two-wire cable.
    - **Moisture sensors (up to 8)**
    - **Water meters (up to 8)**
    - **Pause program**
    - **Stop program**
    - **Rain off**
    - **KWH meter (1 only)**
    - **Frost sensors (2 only)**

- 7 Direct controller sensor inputs connect to the controller terminal strip.
    - **Analog pressure sensor—High, intermediate and low, set points and delays are programmable at controller.**
    - **Analog pressure bore level sensor** (not available this version)
    - **Digital water meter**
    - **Low pressure**
    - **Intermediate pressure** (skips to next station in program sequence)
    - **High pressure**
    - **Program start**

- Programs watering in time, volume (litres) and precipitation (mm).

- Exclusive HydroSector™ for matched precipitation zones.

- Loop program for propagation.

- Run times in hr : min : secs.

- DataValves™ can be assigned to any station.

- DataNodes™ can be assigned to any program.

- PumpNodes connect anywhere on the two-wire cable to pump-start relays.

- Auxiliary pump for chemical/fertigation program.

- Individual pumps can be assigned for each program.

- 2 independent Frost programs

- PC software download from website.

- Communication.
    - **Bluetooth module** (optional)
    - **USB** (optional)
    - **9 pin serial port** (Data radio and GSM, 3G)
    - **Plug-in SD-Systems RF module port**

- PC software - single controller and central control (up to 250 maximum)

SD Systems

- Program running
- Pumps
- Two-wire
- Fault

Two-wire Device Program port

| < | | > |

1	2	3	AM PM / COPY	BACK
4	5	6	ON/OFF SHORT CUT	
7	8	9	0	ENTER

+12V COM PRE WMA COM WMD AUX HP SP LP PRS COM | Power T.W | B | R | O/P |

USB Port   Serial Port
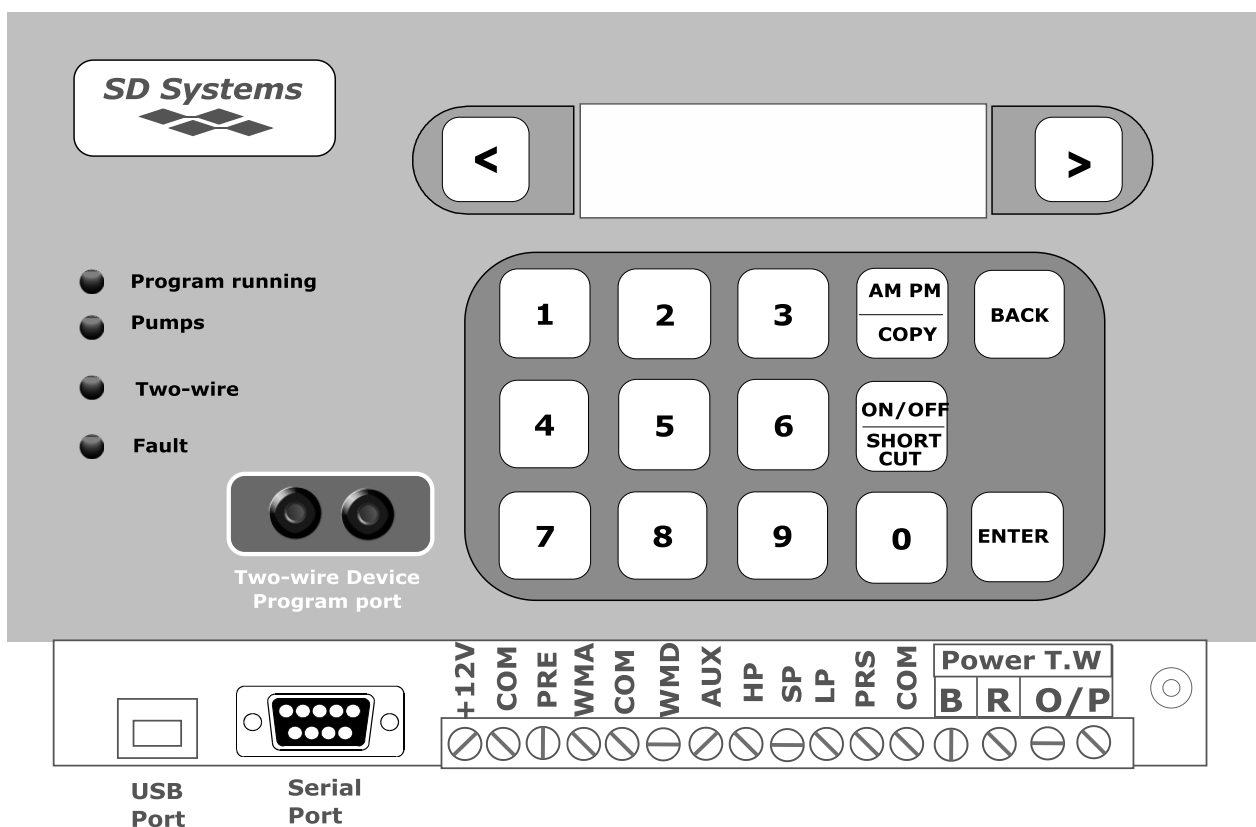
+12V	+12V (250mA)
COM	Common
PRE	Pressure sensor, 4...20mA 0-1000Kpa
WMA	Bore level not available this version
COM	Common
WMD	Water meter, digital 2 Hz max
AUX	Auxiliary pump, digital 2 Hz max
HP	High pressure. (N/O contacts)
SP	Skip pressure, (N/O contacts)
LP	Low pressure, (N/O contacts)
PRS	Program start, (N/O contacts)
COM	Common
B	Black wire, VDC power supply
R	Red wire, VDC power supply
O	Two wire output
P	Two wire output

DataCoils™ are an intelligent solenoid coil eliminating the need for separate valve decoders. DataCoils™ report their status back to the controller.

DataNodes™   Three types are used.

- Digital counter input: (water meters)
- N/O contact: (frost, pause, stop program, rain)
- Moisture: (this is calibrated to the sensors analog output and comes complete with sensor)

PumpNodes output to pump start relays.

24VAC, 60mA
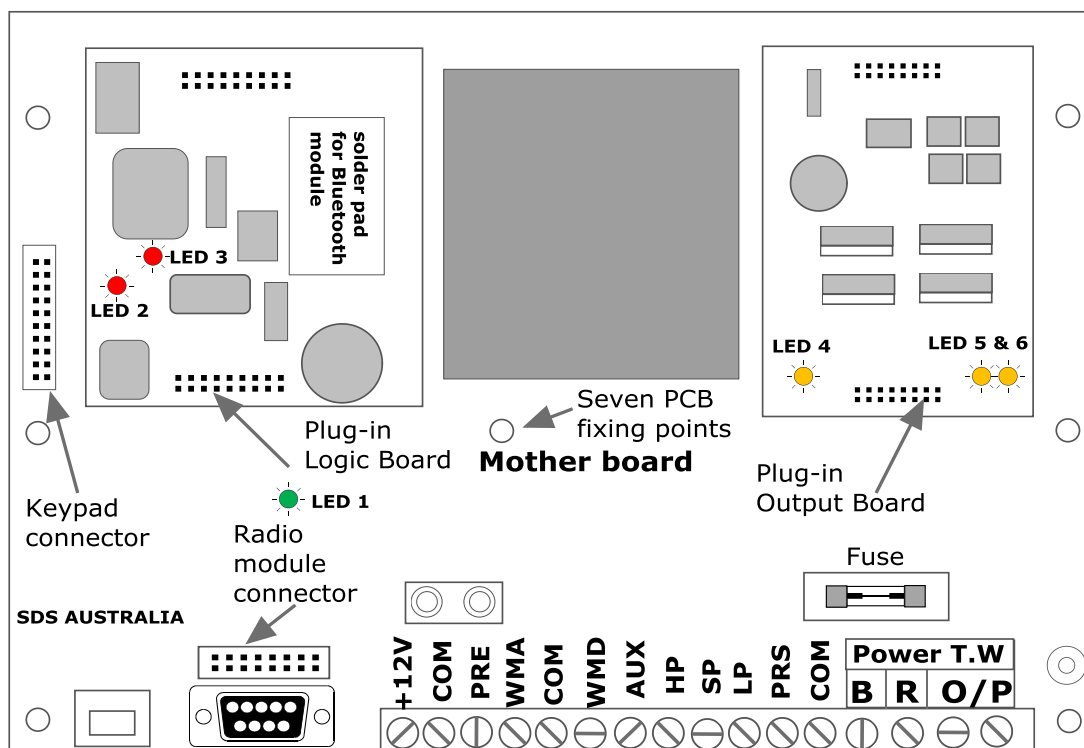
Led 1 = power OK at mother board

Led 2 = power OK at micro controller board

Led 3 flashes = micro controller is OK

Led 4 = power OK at output board

Led 5 and **6** = Two-wire power output on
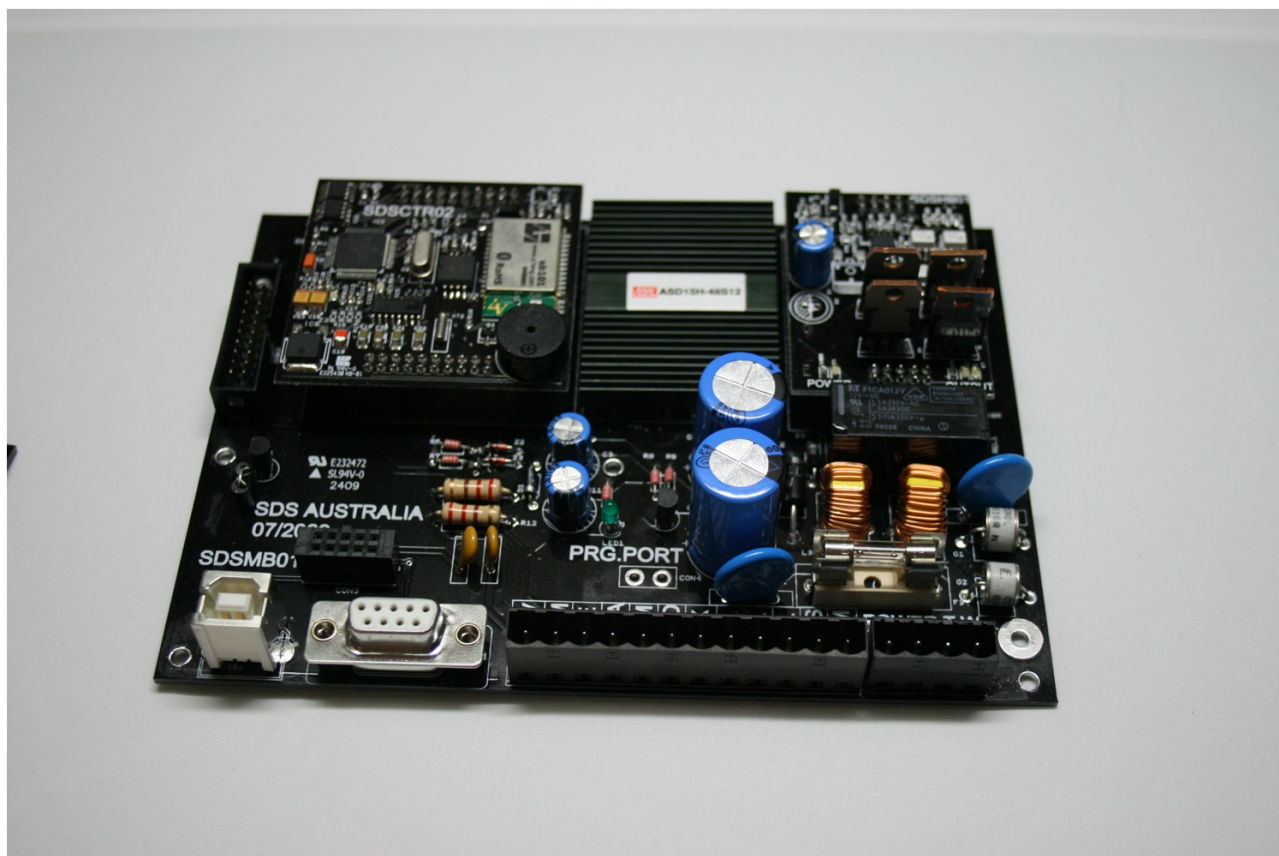
View of controller with front clear lid open in first detent position. The front lid can be opened at 90 and 180 degrees to the front panel.

Terminal strip compartment easily accessible by two screws
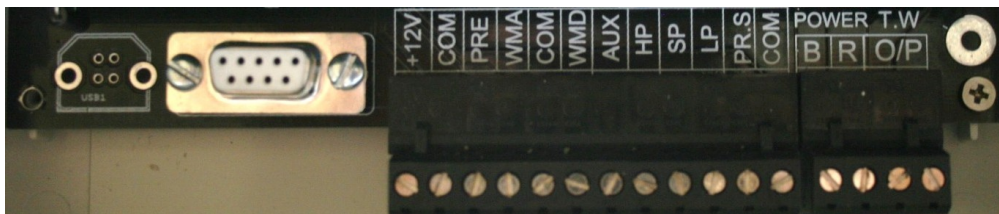
Pluggable terminal strip for ease of service and installation.

Modern design, quality European manufactured enclosure.

Clear front panel for ease of viewing.

Heavy construction for durability

Secure bottom latch

Dimensions:

179H x 199W x 106.5D

Front lid hinges up 90° and 180°

Clear view window

Easily accessible
terminal strip

Press firmly with both thumbs to ensure catch is fully engaged.

Push firmly with both thumbs to release catch.
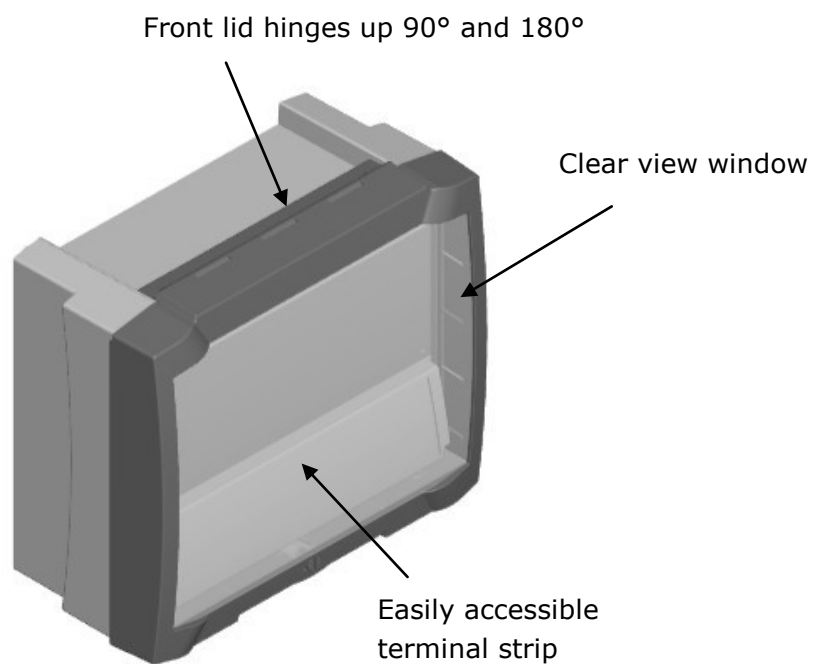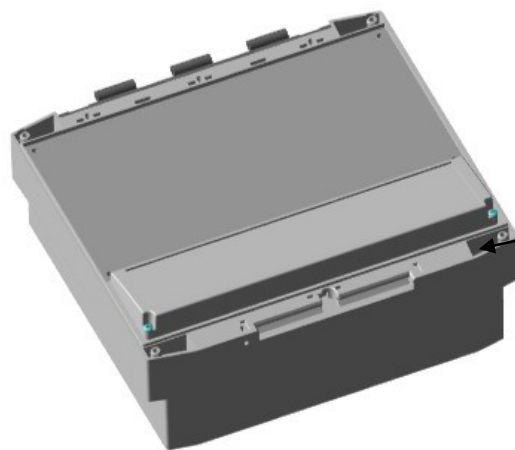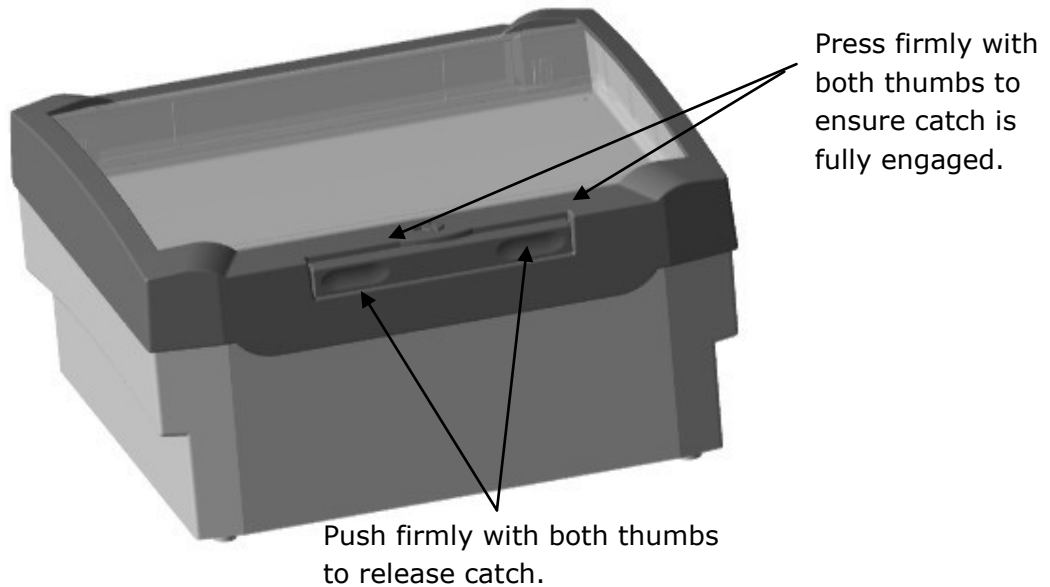
View of box with lid removed.

If directly fixing to wall etc Mounting holes are accessed each corner of box with lid fully opened.

Box can be mounted on DIN rail via mounting holes here.

Din rail brackets supplied separately

200mm top clearance

Do not locate in direct sunlight

Keep clear of electromagnetic interference

1 metre max wire length Pump-Node to pump start relay

Pump   Node

Two-wire cable twisted pair

Earth to ground maximum resistance 10 Ohms.

Pump start relay Omron LY2 24VAC or equivalent

Keep clear of underground high voltage cables

Use certified direct bury cable connectors on all underground cable joints.

DataCoil

Moisture sensor

Install all Two-wire devices and valves in dry valve boxes. If prone to flooding gravel sump to ensure drain off.

SD-1-DR and SD-2-DR Relay module (RelayCube)

The SD-1-DR relay module can be connected anywhere along the two-wire cable network. A separate 24 volt AC power supply is required to provide power to standard 24VAC solenoid coils.

Relay module SD-1-DR has a capacity of 1-24 outputs. Model SD-2-DR has 25-48 outputs

A resettable circuit breaker is fitted for field short circuit protection.

<u>Lightning protection</u>

Do not connect Two-wire cable directly to the controller. Install the SD-SP device to the controller terminals [O/P] connect to ground stake 10 Ohms or less resistance to earth.

Locate as close as possible to ground earth stake.

To field Two-Wire devices

Twisted Pair cable

Module clips to standard 35mm DIN rail

Two-wire   **common**

24VAC

stations

Input   **N**   **L**   **C**   **C**   **1**   **2**   **3**   **4**   **5**   **6**   **7**   **8**   **9**   **10** **11** **12**
TW   **24VAC**

Power on

Reset Fuse

Two-wire active

Any unused outputs can be addressed to DataValves™. For example if only ten direct outputs are used, the field two-wire DataValve capacity would be 38.

Valve numbers

13 14 15 16 17 18 19 20 21 22 23 24   **Made in Australia**

Signal Data Systems   **17**
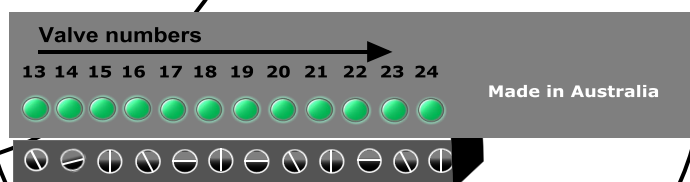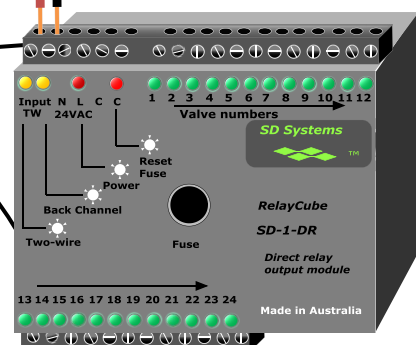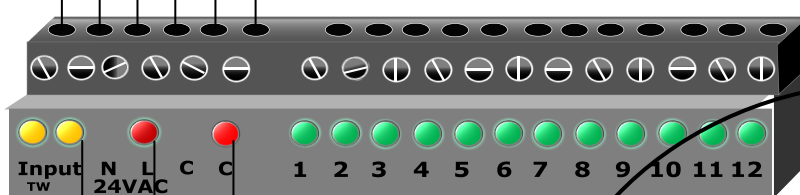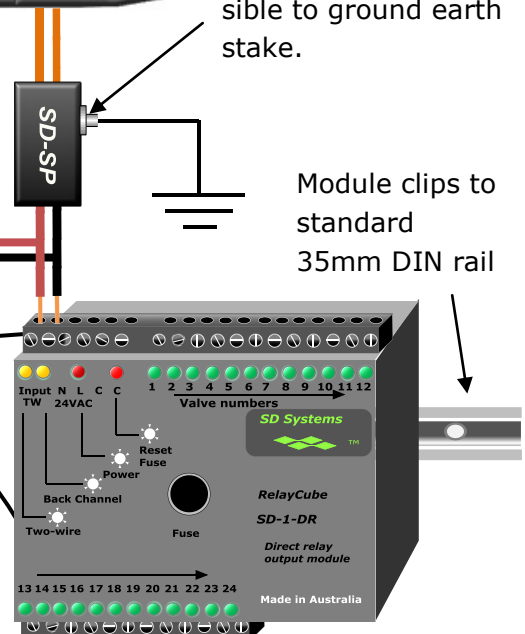
Operational and Environmental Requirements

- Ambient operating Temperature 0 to +45 degrees centigrade.

- Main supply voltage for controller power supply 100—240 VAC 50/60Hz

- Ensure adequate air ventilation to assist cooling if installed in cubicle.

- Power supply must be installed by a qualified electrical technician.

- Use only the power supply supplied with the controller or a recommended SD Systems alternative.

- Position the controller **away from direct sunlight** and water spray.

- Avoid close proximity to possible electromagnetic interference and particularly close proximity to VSD devices unless they meet all the manufactures installation requirements. SD Systems recommend a distance of **5 meters from possible sources of electromagnetic interference.**

Mounting controller

- Locate at an easy viewable eye level with a minimum **top clearance of 200mm** for lid to be fully opened.

- Allow sufficient space at the bottom of the controller for conduits and cable.

- Some installations may require a separate terminal strip mounted in close proximity to the controller if large gauge two-wire cable is used.

- Mount the controller using **all four** mounting points on a flat level surface.

Wiring connections to controller

- Install the controller's VDC power supply in close proximity to the controller.

- The controller is supplied with quick disconnect terminal strips. It may be convenient to unplug the terminal strips to terminate the wiring, they can then be plugged back into their headers on the PCB motherboard.

- Connect the 36VDC RED / BLACK power leads to the R and B terminals on the controller.

- Sensor cables should be not greater than .2mm² **(AWG24)** when directly wiring into the controller terminal strip. The Two-wire terminals [O/P] are connected to the SD-SP filter/protection device. See next section **Lightning Protection**

- Connect the PumpNode™ RED wires to the two-wire cable, BROWN wires to the pump start relay. Ensure the pump start relay is a low current rated device at **maximum 24VAC 65mA** (Omron LY2 24VAC series). Maximum wire length from PumpNode™ to relay is 1 metre.

- When installing a direct relay module SD-1-DR (relay cube) it will require a separate 24VAC power supply. Please ensure this is rated a minimum of 1 amp.

- The RelayCube™ can be mounted anywhere that is convenient along the two-wire cable provided a 24VAC power source is available. **Do not earth** the 24 VAC at the RelayCube™. See page 17.

<u>**Lightning protection**</u>

- For lightning protection to be effective the energy of the strike needs to be instantly gated to earth.

- Connect the ORANGE wires from the SD-SP surge arrester to the O/P terminals at the controller.

- For best results flat braided cable is used to connect to an earth stake of at least 2 metre length with a resistance to earth of 10 Ohms or less. Locate the SD-SP as **close as possible** to the earthing stake.

- For additional protection and easier fault finding of lightning damaged systems, install SD-SL arrestors every 300 meters or every 16 valves.

To reduce the damaging effects of lightning follow these three rules:

1. Ensure that no bare cable conductors are in contact with the soil.

2. Use only approved direct bury cable connectors and be careful not to nick the inner cable insulation and thus exposing bare copper conductors.

3. Do not direct bury. Make sure that the DataNodes™ and DataValves™ are installed in well drained valve boxes and are not subject to flooding or prolonged emersion in water.

<u>**Two-wire cable requirements**</u>

- **Twisted pair cable** with tinned copper conductors certified for direct burial is recommended for optimum performance.

- SD Systems recommends all Two-wire cable joints should be soldered in a professional manner for maximum reliability. If not soldered they must be **tightly** twisted together for a minimum distance of 30mm then clinched over. **It is the installers responsibility to provide low resistance water tight cable joints.**

- Waterproof connectors must be certified for below ground use. Direct bury connectors are **not suitable** for permanent submersion in water unless specifically rated. Long periods of full emersion will cause connector failure.

- Great care should be taken to ensure the cable insulation is not compromised, i.e. nicks in the inner cable insulation etc. **It is the installers responsibility to ensure there is no electrical leakage to earth in the cable network.**

- Ensure the Two-wire cable is well distanced from high voltage cables. If the cable crosses a high voltage line it must be at right angles with a minimum clearance of 600mm.

- Never install the Two-wire cable in the same conduit or strapped to any electrical high voltage cable.

NOTE. Australian Standards for Lightning protection to be effective is 10 Ohms or less resistance to earth.
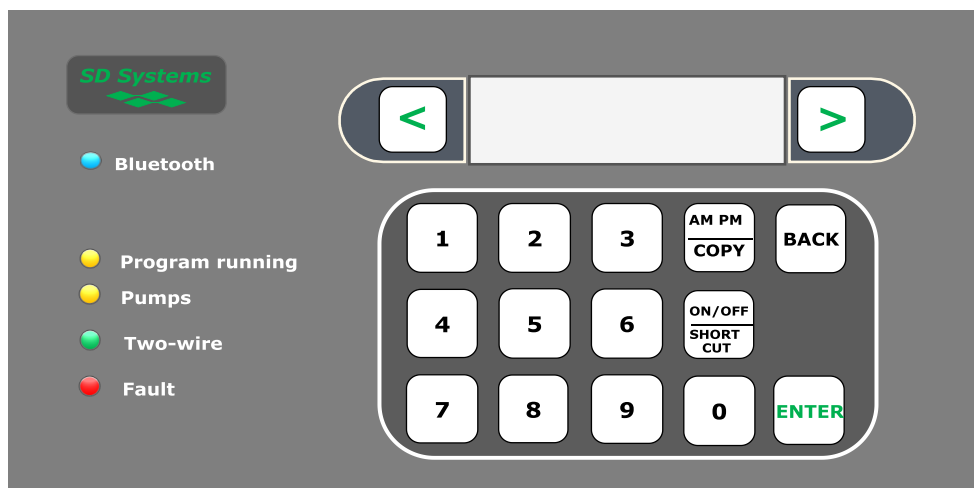
The key pad is a soft touch design with a audible beep to confirm contact. If a key is held down it will fast repeat. This is most helpful in the **Scroll** and **Back** keys.

The menu system is designed to make programming simple and intuitive. The controller is capable of basic programs or complex programs by entering further into the menus.

When the controller is not in use the display backlight and power to the two-wire cable shuts down after 3 minutes. When pressing a key the backlight and power to the two-wire cable will activate.

Use the **Back** key at any time to return to previous entry or keep pressing to return to the current **Time and Date** display

The **Setting basic program** at the beginning of the guide uses default factory settings for master valve/pump, program mode and time/volume option.

The controller **programs status** can be viewed at anytime by pressing the **"0"** key:

A= Programmed	F= Frost program enabled
P= Program in Pause	f= frost program disabled
	R= Program in Rain off

Controller default settings are:

No station run times

All days on

Water meter 1 assigned to all programs

No loop cycle

Master valve/pump address 49, Auxiliary pump address 50.

No start times

Time mode (not volumetric)

% set at 100%

No station delay

Manual stn 01—48

No manual stn time

No manual stn pump selected

System address 000

Valves assigned to corresponding stn numbers.

All DataNodes™ nil input and un-assigned

Analog pressure sensor, no settings

Pressure sensor at controller Digital inputs

Pressure sensor delay, LP 02min SP 03sec HP02sec

Moisture pre-set at 20

Pause sensor– no programs

Rain off sensor—no programs

Program start sensor– program 8.

Water meter pulse– 1 pulse = 1 litre

Precipitation all HydroSectors™ - 12mm

No HydroSectors™ selected

Frost watch disabled

The SDS-50 controller has a two-wire output that supplies electrical power and a communication protocol to operate up to 48 DataValves™ and up to 12 DataNodes™. In addition it is supplied with a pump start PumpNode™ that is connected to the two-wire. The default address for this device is set at 49. The controller can operate an auxiliary pump which is typically used for chemical or fertiliser dosing. The default address for this is 50. If more pumps are in use they should be programmed at a lower number.

Two-Wire Devices (TW Devices)

DataNodes™ have 12 addresses and are numbered as such (1-12) in the TW-Devices menu.

Three variations of DataNodes™ are used. There inputs are: N/O contact **(SW)**, Counter **(CN)** and Moisture **(MO)**

DataNodes™ can have the following functions assigned to them at the controller:

Moisture *	**(MO)**	* The analog output of the moisture sensors are calibrated. The set-points can be programmed at the controller.
Pause	**(SW)**	
Rain on/off	**(SW)**	
Stop program	**(SW)**	
Water Meter	**(CN)**	
KWH meter	**(CN)**	
Frost	**(SW)**	

After the functions have been assigned they are connected to the programming port.

The menu prompts for the TW-device number. After it is selected and entered the settings are downloaded to it. **Caution:** Once disconnected from the port the setting is permanent.

Moisture sensors are programmed in the same manner.

Pause sensors, N/O contact input. When activated (closed contact) the program/s the sensor is assigned to will suspend irrigation until the sensor de-activates, then resume again.

Rain on/off, N/O contact input, stops irrigation until next start time.

Stop program sensor, N/O contact will stop active program/s that have been activated by the **Start Program** sensor input at the controller.

Water meters are assigned to programs, pulse resolutions supported are1 X 1L, 1 X 10L, 1 X 100L and 1 X 1000L.

KHW resolution is 1 x 1KWH

Frost Sensor (1) & (2) two programs are available for frost. Sensor (1) will activate program 7 and sensor (2) will activate program 8.

DataValves™ are programmed by entering its number (address) at the controller. After the address is selected it is then connected to the programming port and downloaded.

PumpNodes have a **24VAC 65mA output**, they activate pump-start relays and are optimised for **Omron LY 24VAC** series relays. The address number at each of the 8 programs is set at default 49 for Master pump and 50 for Auxiliary pump. In the program menu an option is displayed for the pump address which can be selected to a different number and therefore have different pumps per program. After a number (address) is selected the TW-Device (PumpNode) is then connected to the programming port to download its setting.

Controller Two-wire devices programming port

All Two-wire devices configuration are programmed from this port.

Connect the Two-wire devices RED wires, (not polarity sensitive) to this terminal to download their address configuration after being entered at the controller.

⚠ Ensure the device is correctly programmed before disconnection from the program port. Once disconnected the devices configuration and address is permanent and cannot be changed!

(refer pages 42-43)

🟤 **Brown wires—Pump start output**

🔵 **Blue wires—Counter input**

⚫ **Black wires—Switch input**

🔴 **Red wires—Two-wire network**

Quick start programming

To implement a **basic time based program** running one pump or master valve (with the correct current time and date already set in the controller). follow the easy step by step guide below.

From the current **Time and Date** display scroll   **>** | Program < Press Enter > | **ENTER**   **ENTER**   Select program number

ENTER | < P# Mode > Normal | **ENTER** | P# Master Pump Default | **ENTER**

| P# Water days SMTWTFS SMTWTFS | Use **< >** keys to select days   **ON/OFF SHORT CUT**   **ENTER** | < P1 Start Time 1 > NONE |

ON/OFF SHORT CUT | < P# Start time# > 00 : 00 : 00 Am | Enter time with numeric keys Hr:min:sec, select am or pm   **AM PM COPY**   Use **< >** keys for additional starts

ENTER | <P# Option > Time | **ENTER** | <P# WaterStn 01 00 : 00 : 00 100% |

Enter run times with numeric keys Hr:min:sec   Use **< >** keys to advance more stns   **ENTER**   Or   copy run times to next stns   **AM PM COPY**   **ENTER**

| P# station Delay 00:00 Ms | **ENTER** | P# Total Water 00:00:00 | **ENTER** | Program Overlap NONE |

To return to the **Time and Date** display hold the **Back** key down   **BACK**

A basic program is now entered to run on a time basis. The pump/master valve number is 49 (default). No delays between stations have been set. No auxiliary/chemical injection program has been set to run. The program was not optioned for looping so it will start at the programmed times and finish at the end of the last station run time in a program. All default settings have been used. **To Enable a password for security, go to page 36.**

Viewing Programs status

To check programs status press **"0"** at the current Time and Date display. You will see "A" displayed beneath the program you have just completed. See page 20.

Manually start and stop program

From the current **Time and Date** display scroll   **>** | Manual/Test < Press Enter > | **ENTER** | Manual Start Prg < Press Enter > |

ENTER | Program Type < Normal Program > | **ENTER** | Enter Program No? 1 | Select program number

| Program %[0-250] 100 | **ENTER**   To stop program   **ON/OFF SHORT CUT**   Select program number   **ENTER**

Con't. **Quick start programming**

Manually Start/stop Stations

Manual/Test	
<	**Press Enter**	**>**

ENTER

Manual Start Prg	
<	**Press Enter**	**>**

>

Manual Start Stn	
<	**Press Enter**	**>**

ENTER

Set From / End Stn	
From ##	**End ##**

Select station numbers
from keypad

ENTER

Set Station Time	
00 : 00 Ms	

Use numeric keys to
select min : sec

ENTER

< Master Pump >	
start delay 00 : 00	

Use **< >** keys to select   **and**   Use numeric keys in min : sec if a delay
different pump option   **or**   is wanted before the manual start begins

ENTER

To manually advance to another station
use the numeric keys for the stn number

ENTER

**To stop manual
stations**

ON/OFF SHORT CUT

Manually Run valves

Valves will operate without starting pumps or master valves. A useful function for testing.

From the current **Time
and Date** display scroll

T.W. DEVICES	
<	**Press Enter**	**>**

ENTER

Use **< >** keys to scroll to
the **"Run Valves"** display

ENTER

Select Valves
#00 #00 #00 #00

Use numeric keys and
< > to next valve

ENTER

Set Run Time
00 : 10 : 00

Use numeric keys to set hr:min:sec
and press enter to start

ENTER

To stop valves
running

ON/OFF SHORT CUT

Raining off programs.

From the current **Time
and Date** display scroll

Program	
<	**Press Enter**	**>**

ENTER

Program Entry	
<	**Press Enter**	**>**

>
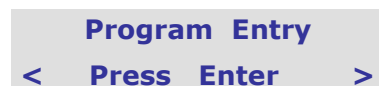
Rain-Off Program	
<	**Press Enter**	**>**

ENTER

Rain-off program
1 2 3 4 5 6 7 8

Use **< >** keys to
select programs

ON/OFF SHORT CUT   **ENTER**   To de-select Rain-Off repeat above
use **< >** keys to select program

ON/OFF SHORT CUT   **ENTER**

Pausing programs.

Same as Rain off but scroll only to the **"Pause Program"** display, see above.

Time and Date.

On first powering up, the time will need to be set to your current time and date. The controller will display this

Current day Date
Current time

<	Time & Date < Press Enter >	ENTER	Enter The Time < Press Enter >	ENTER

Enter The Time 00 : 00 : 00	Use scroll **< >** keys and enter the current time with numeric keys. Note it is in hr:min:sec	ENTER

>	Enter Date D/M/Y < Press Enter >	ENTER	Use scroll **< >** keys and enter date with numeric keys	ENTER	>

Set Time Format < Press Enter >	ENTER	Set Time Format < 12 Hours >	To select 12hr or 24hr	ENTER	BACK
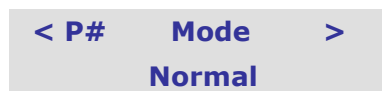
Note. The SDS-50 controller is factory default set for the **DataCoils™** to be assigned in a matching numeric sequence, i.e. [Station (1)-valve (1)], [station (2)-valve (2)] etc. If you wish to change this proceed to section **Two-wire Devices—Wire Valves.** Page 41
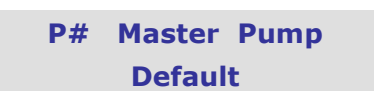
Default for the master pump is number 49. This PumpNode is supplied pre-programmed with the controller. Additional PumpNodes can be programmed and assigned to programs for additional pumps. The programs are designed for a maximum of 1 pump per program.
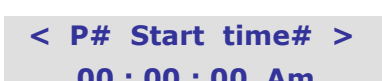
If a master valve is used program the DataCoil™ at the controller TW programming port to the address number selected. (49 is default)

Setting up a basic program — days on/off, start times, station run times.

From the current **Time and Date** display scroll

>	Program < Press Enter >	ENTER	Program Entry < Press Enter >

ENTER	Use numeric keys to select program number	ENTER	< P# Mode > Normal	ENTER

P# Master Pump Default	ENTER	P# Water days SMTWTFS SMTWTFS	Use **< >** keys to select days	ON/OFF SHORT CUT
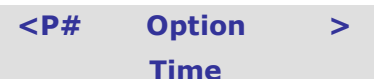
When selection complete	ENTER	< P1 Start Time 1 > NONE	ON/OFF SHORT CUT	< P# Start time# > 00 : 00 : 00 Am

Enter start time with numeric keys. Hr:min:sec, select am/pm	AM PM COPY	Use **< >** keys to advance to start 2-4	ENTER

<P# Option > Time	Use **< >** keys if selecting volumetric option, see page 28

Cont'd. **Setting up a basic program — days on/off, start times, station run times.**

| ENTER | **<P#   WaterStn   01**
00 : 00 : 00   100% | Enter time with numeric keys Hr:min:sec | **>** | Continue with run time entries | **or** |

| AM PM / COPY | To copy run times to next stns | ENTER | **P# Station Delay**
00 : 00 Ms | Enter time with numeric keys min:sec |

| ENTER | **P# Total water**
00 : 00 : 00 | ENTER | **Program Overlap**
NONE | BACK | Return to **Date Time** display |

A basic program has now been entered using default factory option settings i.e. Time based station watering, no loop program, no auxiliary program and no station delays. The Master valve/pump start is at no. 49.

Note

Station Delay: the time before the next valve is switched on after the current valve is switched off with the pump still running. This is useful for slow closing valves due to flow or hydraulic problems.

Loop program.

A loop program is used when multiple start times are required for a program with delays between the start times over a set period of time. The loop has a start time and end time. During these times a delay is programmed (loop delay) this is the time delay before watering starts again from the first watering station and the cycle repeats until loop end time.

| **Program Entry**
<   Press Enter   > | ENTER | Enter program number with numeric keys | ENTER | **< P#   Mode   >**
Normal |

| **>** | **<P#   Mode   >**
Loop | ENTER | **P# Master Pump**
Default | ENTER |

| **P# Water days**
SMTWTFS SMTWTFS | Use **< >** keys to select | ON/OFF SHORT CUT | ENTER | **P# Loop Start Time**
None |

| ON/OFF SHORT CUT | **P# Loop Start Time**
00 : 00 : 00 Am | Enter start with numeric keys hr:min:sec | ENTER | **P# Loop End Time**
00 : 00 : 00 Am |

| Enter time with numeric keys hr:min:sec | ENTER | **P#   loop   Delay**
None | ON/OFF SHORT CUT |

| **P#   loop Delay**
00 : 00 : 00 | Enter delay with numeric keys hr:min:sec | ENTER | **<P#   Option   >**
Time |

| ENTER | **<P#   WaterStn   01**
00 : 00 : 00   100% | Enter water time with numeric keys hr:min:sec | **>** | Repeat for next stations |

| ENTER | **P#   Station Delay**
00 : 00 Ms | Enter delay time with numeric keys min:sec | ENTER |

Frost Program description

The controller uses program 7 and 8 for frost control. In the TW-Devices menu two frost sensor options, numbers (1) and (2), are available to assign to DataNodes. Sensor(1) will activate program 7 and Sensor(2) will activate program 8. When the sensors are activated all current irrigation activity will be stopped and a loop cycle will commence on either or both programs until the sensor de-activates.

When the **Frost Watch** program is enabled the two-wire cable will switch on every 8 minutes for a brief period to check the frost sensor status. The **Frost Watch** start and finish times are selectable. Depending on the frost risk, the **Frost Watch** program can be suspended and re-commenced at any time at the controller keypad or remotely at the computer software if connected.

Frost sensors (1) & (2) assign to DataNode™

From the current **Time and Date** display scroll **[>]** | T.W. DEVICES / < Press Enter > | **[ENTER]** Scroll to the **TW Data Nodes**

[>] | T.W Data Nodes / < Press Enter > | **[ENTER]** | Enter DN No. / 00 (DN N0. 1—12) | Use numeric keys to enter number

| < Select Input > / Nil | Scroll to Frost sensor (1) or (2) **[ENTER]** We will assume **(1)** was selected **program 7** is now a frost program

Note. See page 42,43 for configuring & downloading settings to DataNodes™

Frost program

From the current **Time and Date** display scroll **[>]** | Program Entry / < Press Enter > | **[ENTER]** Select 7 and **Enter** **[ENTER]**

| P# Master Pump / Default | **[ENTER]** | < F7 Option > / Time | If volumetric, select **[ENTER]**

| <P# WaterStn 01 / 00 : 00 : 00 100% | Use numeric keys to enter run time hr:min;sec **[ENTER]** | P# Station Delay / 00 : 00 Ms

If required use numeric keys to enter delay between stations **[ENTER]**

Note. The Frost program does not require days on/off to be set

Frost program start time, program finish time.

From the current **Time and Date** display scroll **>** | SYSTEM SETTINGS < Press Enter > | **ENTER** | FrostTime start < Press Enter >

ENTER | Frost Watch On 00 : 00 : 00 Am | Use numeric keys to enter time hr:min:sec | AM PM COPY | **ENTER** | **>**

FrostTime Finish < Press Enter > | **ENTER** | As previous, use numeric keys to enter time hr:min:sec | AM PM COPY | **ENTER**

Frost Watch enable/disable

From the current **Time and Date** display scroll **>** | SYSTEM SETTINGS < Press Enter > | **ENTER** | Use < > keys and scroll to **Frost Watch**

Frost Watch < Press Enter > | **ENTER** | Use scroll < > keys to select Enabled or Disabled | **ENTER**

Note. When the Frost Watch function is enabled for programs 6 or 7, or both, the status of the frost program can be viewed by pressing the "0" Key from the current **Time and Day** display. "F" upper case indicates Frost watch is enabled, "f" lower case indicates function is not disabled.

Volumetric watering

Alternative to watering by time, a set volume of water can be programmed per station. The controller will then "count" pulses from the water meter assigned to that program. Pulse resolutions supported are: 1 litre, 10 litres, 100 litres and 1000 litres

Ensure the water meter pulse ratio is set in the controller, refer to **Systems Settings**, **Flow Meter Pulse,** page 36.

From **"Program Entry"** display use **Enter** key until — | <P# Option > Time | **>** | <P# Option > VOLUMETRIC

ENTER | Will clear stn's <Enter> or <Back>? | **ENTER** | When changing stn run format the existing stn values are erased.

<P# WaterStn 01 000000 L 100% | Use numeric keys to enter total litres | **>** | Repeat for each station

ENTER | P# Station Delay 00 : 00 Ms | Enter time from keypad min:sec | **ENTER** | P# Total Water 00000000 CM

Water Meters

The controller supports up to 8 water meters. Only 1 meter can be assigned to a program. **Water meter (1) assigned to all programs as default setting. This is the [WMD] input terminal on the controller.**

Additional 7 water meters inputs are connected to DataNodes™ on the two-wire cable.

When a water meter is assigned to a DataNode™ this can then be assigned to a program.

⚠ Due to Water Meters 2—8 being connected by DataNodes to the system they are assigned in a preferential numeric order to the DataNodes. For example if DataNode address 6 is first selected to have a Water Meter input it would be assigned WM2. If DataNode address 8 was next selected to have a Water Meter input it would be assigned WM3.

Water Meter pulse ratio

From the **Time and Day** display scroll   **>** | SYSTEM SETTINGS < Press Enter > | **ENTER** | Flow Meter pulse < Press Enter > |

ENTER | < M # Pulse Ratio > 1 Pulse = 1 ltr | Use **< >** keys to set pulse value   **>**   Use numeric keys to select next meter

Use **< >** keys to set pulse value and repeat as required   **ENTER**

Water Meters 2-8 configured to DataNodes™.

From the **Time and Day** display scroll   **>** | T.W. DEVICES < Press Enter > | **ENTER**   Use **< >** keys to scroll to **"T.W Data Nodes"** display

| T.W Data Nodes < Press Enter > | **ENTER** | Enter DN No. 00 (DN N0. 1—12) | Use numeric keys to enter number   **ENTER**

| < Select Input > Nil | Use **< >** keys to select water meter   **ENTER**   Use < > keys to scroll to **View DataNodes** display to verify

| View Data Nodes < Press Enter > | **ENTER** | < Add. 01 Add. 02 > | ← **DataNodes 1-12**   ← **Sensor/Input type**

Connect to TW-Devices Program port and download setting, page 43.

Çon't **Water Meters**

Water meters, assignment to programs. (default is **WM (1)** all programs)

Program Entry		
<	Press Enter	>

<

WM Configuration		
<	Press Enter	>

ENTER

Program No. #		
<	WaterMeter #	>

In this order use numeric keys to select the program.
Use **< >** keys to select the water meter number.

ENTER

Note: When assigning water meters to programs it is the **water meter number** and not the DataNode™ that is being assigned to a program. Water meter (1) is always assigned to the controller [**WMD**] input terminal. Water meters 2—8 are assigned to DataNodes™.

Ensure the pulse ratio has been set as previously described above for each water meter.

Adjusting water meter total to the same reading as the water meter register

From the current **Time and Date** display**< >** scroll

SYSTEM SETTINGS		
<	Press Enter	>

ENTER

Flow Meter pulse		
<	Press Enter	>

>

Factory Default		
<	Press Enter	>

ENTER

Default < 1234 >	
WM Config <6021>	

Key in **6021**

<	WaterMeter 1	>
	000000000	CM

Scroll **< >** to the required water meter, use numeric keys only to key in correct total

ENTER

Auxiliary Pump function

The auxiliary is used for chemical / fertiliser injection. See **Systems Setting—Auxiliary Pump,** page 36. To activate this function.

Auxiliary pumps are activated by pump start Nodes. The default address is 50 for all programs. This can be changed for different programs.

Upon entering a program when the Auxiliary function is enabled the following will display:

After the **P# Total Water** display ⟶ | **P#   Prewet Delay**
00 : 00 Ms | Use keypad to enter delay time min : sec   ENTER

| **P#   Aux.   Pump**
default | Default is 50. For different Aux pumps select available address number less than 50 | ON/OFF SHORT CUT | Use numeric keys to select   ENTER

| **<P#   Aux.   Stn 01>**
00 : 00 :00   100% | Use keypad to enter aux stn run times hr:min:sec | AM PM COPY | Copy to next stations or use < > keys

Repeat for each stations   ENTER

Note

The auxiliary pre-wet is the time the station runs without the dosing (auxiliary) pump running. The auxiliary run time is the dosing pump run time during the stations watering time. The balance of the time on the stations watering time is a post-wash time.

This function may be used for other applications.

For example, if no pre-wet delay is selected and the Aux run time is the same as the station/s run time the auxiliary will run for the station/s duration. Many connotations of this are possible by manipulation of the program/s and auxiliary pump/s.

Adding and Assigning Master Pumps

When in the **Program Entry** menu a display of **Master Pump Default** will be indicated. The default pump start Node address is **49**. This can be changed as follows -

| **P#   Master Pump**
Default | ON/OFF SHORT CUT | **P#   Master Pump**
00 | Use numeric keys to select. Must be 49 or less

ENTER   To program the pump start or master valve Nodes; See page 39 **"Program Valves Program Pump Start Nodes"**

Note—The maximum address output capacity of the controller is 50. Being, 48 valves, 1 master pump (49) and 1 Aux pump (50). When additional pumps/master valves are programmed they use valve address numbers. Hence if an additional 2 pumps are added the valve numbers are reduced by 2 giving a maximum of 46 valve capacity. e.g. M/V (49), (48) (47), therefore 1-46 is the new field valve capacity.

Pause program

A running program can be paused from the keypad and restarted at its pause point later

Program Entry			**>**	**ENTER**	**Pause Program**								Use **< >** keys to
<	**Press Enter**	**>**			**1 2 3 4 5 6 7 8**								select program

ON/OFF SHORT CUT — To re-start program repeat above use **< >** keys to select program — **ON/OFF SHORT CUT**

Raining off programs.

Programs can be suspended or Rained Off for a period of time from the keypad, at any time they can be activated again to start at their programmed start times.

Program Entry			**>**	**Rain-Off Program**			**ENTER**
<	**Press Enter**	**>**		**<**	**Press Enter**	**>**	

Rain-off program								Use **< >** keys to	**ON/OFF SHORT CUT**
1 2 3 4 5 6 7 8								select program	
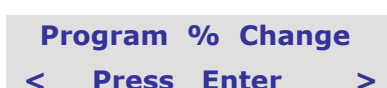
To re-start program repeat above use **< >** keys to select program — **ON/OFF SHORT CUT**

Station run time % change

% change will increase or decrease the station run times in the program/s selected. The original programmed time is 100%

From the current **Time and Date** display scroll — **>** — | **Program** | | | **ENTER** **>** |
| **<** | **Press   Enter** | **>** | |

Program % Change			**ENTER**	Select program number	**ENTER**	**Program %[0 –250]**
<	**Press Enter**	**>**				**100**

Use numeric keys to enter new % — **ENTER**

Note: 100% is the original programmed time

To clear programs

A single program or all programs can be cleared of station run times/volume totals, day calendar, start times, station delay times.

HydroSector assigned programs will revert to standard programs but station numbers assigned to HydroSectors will remain.

System Settings, Communication, TW Devices, Inputs, Water Meter Configuration will remain as programmed.

To revert to factory settings see **page 48.**

Con't **To clear programs**

Program Entry < **Press Enter** >	**>**	**Clear Program** < **Press Enter** >	ENTER

Clear Program **Program 1 [0=All]**	Select program number	ENTER

Stop a program running.

To immediately stop a program or programs whilst they are running.

ON/OFF SHORT CUT	**Select Program?** **Program 0 [0=All]**	Enter program number from keypad.	ENTER

Stop a stations running.

Press   ON/OFF
SHORT CUT

View programs running

Operating program/s will indicate with a flashing program number/s on the display.

Display will Flash	**Running Programs** **1 # # # # # # #**	Enter program number from keypad.	**P# N M# @100%** **Stn. # 00 : 00 : 00**

Note.

Program % setting

Master valve/pump number
alternates with Aux pump

Normal or Loop program

Program number → **P# N M# @100%**
S# 00 : 00 : 00   **S# V# V# V# V#**

Station running

Time remaining hrs : min : sec
and alternates with current
valves open indication
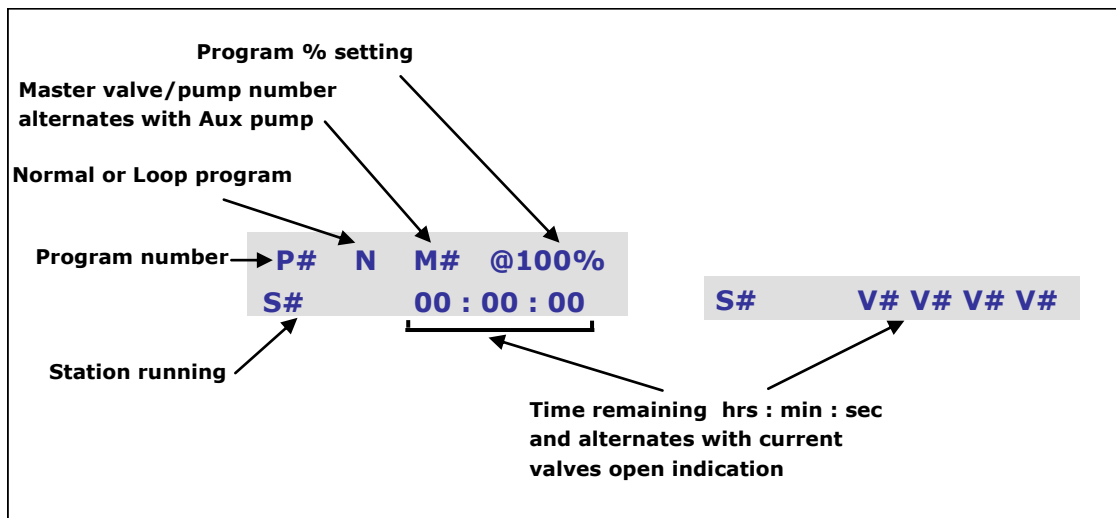
Manual/Test

Manually start program.

From the current **Time and Date** display scroll   **>**   **Manual/Test**   **<   Press   Enter   >**   **ENTER**   **Manual   Start   Prg**   **<   Press   Enter   >**

ENTER   **Program   Type**   **<   Normal   Program   >**   Use **< >** to select Normal or HydroSector   **ENTER**

Enter   Program   No?   **1**   Use numeric keys to enter selection   **ENTER**   **Program   %[0-250]**   **100**

Use numeric keys if a % change is required   **ENTER**

To stop a running program, refer to page 33.

Manually Start/stop Stations

Manual/Test   **<   Press   Enter   >**   **ENTER**   **Manual   Start   Prg**   **<   Press   Enter   >**   **>**

Manual   Start   Stn   **<   Press   Enter   >**   **ENTER**   **Set   From   /   End   Stn**   **From   ##   End ##**   Select station numbers from keypad

ENTER   **Set   Station   Time**   **00 : 00   Ms**   Use numeric keys to select min : sec   **ENTER**   **<   Master   Pump   >**   **start   delay   00 : 00**

Use **< >** keys to select different pump option   **and**   **or**   Use numeric keys in min : sec if a delay is wanted before the manual start begins   **ENTER**

To manually advance to another stn use numeric keys to enter the stn number   **ENTER**

View manual stations running

Go to the current **Time and Date** display. **"M"** will flash indicating manual stns running   **AM PM** **COPY**   **Man. Stns   M#**   **Stn   No.   ##   (00 : 00)**

Stop Manual Stations

ON/OFF **SHORT CUT**

Self Test

Self Test is not enabled on this version

Information

View log

Up to 999 events are held in memory

From the current Time and date display scroll **>** | **INFORMATION** < **Press Enter** > | **ENTER** | **View Log** < **Press Enter** >

ENTER Use scroll keys **< >** to view | **## Date Time** **Event**

Delete Log

From the **View Log** display scroll **>** | **Delete Log** < **Press Enter** > | **ENTER** | **Delete Log File?** **Enter / Back**

Press **Enter** to delete log history
or press **Back** to continue

System Faults

From the **View Log** display scroll   Use **< >** keys | **System faults** < **Press Enter** > | Current fault will be displayed

To clear fault indicator   **ON/OFF SHORT CUT**

Water meter count totals (cubic Metres)

INFORMATION < **Press Enter** > | **ENTER** | **>** | **WM—1 Total** **0000000000 CM** | Use numeric keys to select next meter

Water meter flow rates

INFORMATION < **Press Enter** > | **ENTER** | **>** | **WM—1 Total** **0000000000 CM** | **>**

WM—1 Flow **00000 L/Minute**   Use numeric keys to select next meter

Power Meter total

INFORMATION < **Press Enter** > | Use **< >** keys to advance to **Power Meter** display | **Power Meter** **0000000 KWH**

Electrical current load

INFORMATION < **Press Enter** > | Use **< >** keys to advance to **TW Power** display, as milliamps. | **TW current** **0000mA**

Software Version

INFORMATION	Use **< >** keys to advance to
< Press Enter >	**Software Version** display

System Settings

Water Meter Pulse

It is necessary to set the pulse ratio to match the water meter output pulses

From the **Time and Day** display scroll **>** | SYSTEM SETTINGS | **ENTER** | Flow Meter pulse |
|---|---|

ENTER | < M # Pulse Ratio   > | Use **<   >** keys to set pulse value **>** Use numeric keys to select next meter

Use **<   >** keys to set pulse **ENTER**

Auxiliary Pump

This function activates the auxiliary pump program.

From the **SYSTEM SETTING** display **ENTER** **>** **Scroll to** Auxilliary Config. **ENTER**

< Auxilliary Pump > OFF | Use **<   >** keys to activate auxiliary pump function **>** **ENTER**

Enable Password

For firmware version 2.33 and above.

From the **SYSTEM SETTING** display **ENTER** **>** **Scroll to** Change password **ENTER**

New password **** | Use numeric keys to select four digit number **ENTER**

Your password is now enabled.The password will now be required to make any changes to the controller program including wiring list, system settings etc.

Disable Password

From the **SYSTEM SETTING** display **ENTER** Enter your password **ENTER** **Scroll to** Change password

ENTER New password **** | Use numeric keys and enter **0000** **ENTER**
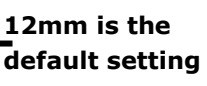
Should the operator forget the password please contact the manufacturer sales@signal.com.au or call 08 92402322

Precipitation

This function sets the precipitation for each HydroSector.

From the **System Settings** display   `ENTER`   Use **< >** keys to advance to "Precipitation" display

Precipitation
<   **Press Enter**   **>**

`ENTER`

<   **HydroSector 1**   **>**
12mm

12mm is the default setting ←

Use numeric keys for new value, use **< >** to next HydroSectors and repeat   `ENTER`

Delay Times

This menu has three delay parameters. **Pressure Delay**, **Water Flow Delay** and **Last Station On Delay.**

Pressure Delay

An analog pressure sensor connected to the [**PRE**] terminal at the controller or digital sensors connected to the [HP], [SP] and [LP] terminals will stop all irrigation after a pre-set time delay on Low and High pressure. It will skip a valve when the pressure reaches the Skip [SP] (intermediate pre-set pressure.)

From the **System Settings** display   `ENTER`   Use **< >** keys to advance to "Delay Time" display

Delay Time
<   **Press Enter**   **>**

`ENTER`

Pressure Delay
L02m   S03s   H02s

The display indicates Low Skip and High pressure at the default settings L. min   S. sec   H. sec

Use numeric keys to enter delay and **< >** to selected field.   `ENTER`

Water meter pulse Delay

If the controller is operating in the volumetric mode and no pulses are detected for this pre-set time all irrigation will be stopped

From the **System Settings** display   `ENTER`   Use **< >** keys to advance to "Delay Time" display

Delay Time
<   **Press Enter**   **>**

`ENTER` `ENTER`

Water Flow Delay
03 Minutes

Use numeric keys for new time   `ENTER`

Last station On delay

This function will keep the last valve on after a program and pumps have stopped running. Allowing for ramp down and preventing pumping against closed heads

From the **System Settings** display   `ENTER`   Use **< >** keys to advance to "Delay Time" display

Delay Time
<   **Press Enter**   **>**

`ENTER`

`ENTER` `ENTER`

Last Station On
00 Minutes

Use numeric keys for new time   `ENTER`

Communication

The controller has different options for communication. These are - RS232 via the 9 pin DB9 serial port for Data Radio or GSM link with a computer. Bluetooth (optional) can be enabled for convenient local programming for example, via a laptop computer. These options are set up at the controller keypad. In addition, the controller can be connected directly to a computer via the serial port or USB cable (if USB optioned).

To communicate with the PC software a controller must be assigned an address 0-250. Factory default is 000.

System Address

From the current **Time and Day** display scroll   **>**   **COMMUNICATION** **< Press Enter >**   **ENTER**

System Address **< Press Enter >**   **ENTER**   **System Address** **000**   Enter controller address from keypad   **ENTER**

Data radio connection

Connect Data radio to serial port. Controller will automatically configure.

GSM/3G connection

- GSM/3G modem to serial port. Controller will automatically configure.
- SIM card must support SMS texting and Data, at the controller modem and PC modem.

Mobile telephone numbers accepted by the controller.

The controller will accept up to three telephone numbers in the menu, designated as 1, 2 and 3. Each one varies slightly in its function:

Mobile ID (1). SMS commands only to and from the controller, see page 39.

Mobile ID (2). SMS commands as above but includes an SMS message if a fault event occurs.

Mobile ID (3). SMS commands as **(1)** above including a status report sent from the controller at 7.00am each morning, see page 40. **(WM)**

From the **Communication** display   **ENTER**   **System Address** **< Press Enter >**   Use **< >** keys to advance to the **Phone Number ID** display

Phone Number ID **< Press Enter >**   **ENTER**   **< Phone Number ID 1 >** **< >**   Select 1,2 or 3 with **< >** keys and enter number

Note. When the PC is connected in texting mode (SMS) as above in (1) (2) & (3) the same commands for mobile phone, including fault reports and WM totals as on pages 39 and 40, are available. When programming a controller or retrieving a log file from a controller to the PC, the connection is changed at the PC software to a direct GSM data connection to the controller to enable the larger data file transfers.

BlueTooth

This function enables or disables the Bluetooth communication port. (optional extra)

From the **Commu-nication** display   [ENTER] | **System Address**
 <   **Press Enter**   > | **>** | **Bluetooth**
 <   **Press Enter**   > |

If Bluetooth option is fitted   [ENTER]   Use **< >** keys to enable/disable   [ENTER]   **>** | **Bluetooth Pass key**
 <   **Press Enter**   > |

[ENTER] | **Enter Pass key**
 0000 | Use numeric keys to enter your PIN number   [ENTER]

The controller will communicate with the mobile telephone ID's that have been entered into the controller memory with a GSM modem plugged into the RS232 serial port.

GSM text commands, The following SMS commands can be sent to the controller:

	Function	Command	
1.	Start Program	**PGS**	**PGS**<space>prog nos or 0 for all
2.	Stop Program	**PGE**	**PGE**<space>prog nos or 0 for all
3.	Pause Program	**PPS**	**PPS**<space>prog nos or 0 for all
4.	Un-Pause Program	**PPE**	**PPE**<space>prog nos or 0 for all
5.	Rain-Off Program	**ROS**	**ROS**<space>prog nos or 0 for all
6.	Rain-On program	**ROE**	**ROE**<space>prog nos or 0 for all
7.	Percentage Program	**PER**	**PER**<space>prog nos<space>percentage
8.	DataValve™ On Manual	**DVS**	**DVS**<space>valve nos<space>valve nos (up to 4)
9.	DataValve™ Off	**DVE**	**DVE**
10.	Station Start Manually	**STS**	**STS**<space>1st stn<space>last stn<space>run time
11.	Station Stop Manually	**STE**	**STE**
12.	Water Meter & Faults	**WM**	**WM**
13.	Enable instant SMS fault	**ST**	**ST** (Mob. ID number 2.)
14.	Disable instant SMS fault	**SP**	**SP** (Mob. ID number 2.)
15.	View controller status	**PGS**	

Note. insert <space> between station, program and run times.

       DataValve™ manual function is set for 10 minute run time.

The controller accepts SMS commands only from the mobile number which is entered into the **Phone Number ID** at the controller. The SMS receiving and sending time depends on the network traffic conditions

Commands are not case sensitive (use upper case or lower case or both together)

Examples of GSM text commands

Start programs 1,2 and 3

PGS 123	Programs 1,2 and 3 will run

Percentage adjustment of programs 1,2 and 3 to 75% of their programmed time.

PER 123 075	Percentage adjusted to 75% on programs 1,2 and 3

DataValve™ 1,8,12 and 46 on manually

DVS 01 08 12 46	Valves 1,8,12 and 46 will run for the default time of 10 mins

Stations 1 to 25 Start manually for 5 minutes

STS 01 25 05	Stations 1 to 25 will run for 5 minutes each

GSM command controller responses

Run Prg> (displays programs running)

Pause> (displays programs paused)

Rain> (displays programs rained off)

Man Valv> (displays command activated at controller, manually on valves)

Man Stn> (displays command activated at controller, stations on and run times)

%> (percentage setting of programs)

T/D> (current time and date on each return message)

WM> The SMS message to this command is as below:

    WM1> (Reading of Water Meter 1)

    WM2> (Reading of Water Meter 2)

    WM3> (Reading of Water Meter 3)

    WM4> (Reading of Water Meter 4)

    WM5> (Reading of Water Meter 5)

    WM6> (Reading of Water Meter 6)

    WM7> (Reading of Water Meter 7)

    WM8> (Reading of Water Meter 8)

    KWH> (Reading of Power Meter)

    F> (displays fault numbers as indicated below)

        1 High pressure

        2 Low Pressure

        3 Skip pressure

        6 Water Meter Error

        7 TW Short Circuit

Two-wire Devices

View valves On-line

This is the field DataValves™ messaging back as on-line and communicating

From the Time and
Date display use **< >**

T.W. DEVICES		
<	Press Enter	>

ENTER

Valves On-Line		
<	Press Enter	>

ENTER

## VALVES ONLINE	
<	>

Current valves and PumpNodes on-line
will display. Use **< >** keys to view.

"Wire" Valves to stations

If the default setting is not suitable, valves can be re-assigned to different stations. This is a useful feature, for example, to hydraulically balance a system.

From the **"T.W De-vices"** display

ENTER **>**

Wire Valves		
<	Press Enter	>

ENTER

Note

The default is valve 01 assigned to station 01, V02 to Stn 02 etc. To change use **< >** keys

V01x	02x	03x	04x
S01	02	03	04

← Valves 1—48
← Stations 1-48

>

Use keypad to assign **valves** to stations

ENTER

View Wiring List

Reviews valve assignment list

From the **"T.W De-vices"** display

ENTER **>**

View Wiring List		
<	Press Enter	>

ENTER

V01x	02x	03x	04x
S01	02	03	04

Run valves manually

Valves will operate electrically without starting pumps or master valves. A useful function for testing DataCoils.

From the **"T.W De-vices"** display

ENTER

Use **< >** keys to scroll to the **Run Valves** display

Run Valves		
<	Press Enter	>

ENTER

Select Valves	
#00 #00 #00 #00	

Use numeric keys and **< >** to next valve

ENTER

Set Run Time	
00 : 00 : 00	

ENTER

Use numeric keys to
enter time hr:min:sec

ENTER

DataValve and PumpNode address number programming

To program a DataValve or PumpNode number. Connect the valve or PumpNode to the **Two-Wire Devices program port**. Enter the required number at the controller and download.

⚠️ **Caution:** Ensure programming is correct before disconnecting from the program port. Once disconnected the device cannot be reprogramed

From the **"T.W Devices"** display   `ENTER`   Use **< >** keys to scroll to "Program Valves" display

Program Valves
<   Press   Enter   >

`ENTER`

Enter Valve No.
00

Use the numeric keys to enter the number and ensure DataCoil™ is connected to the program port   `ENTER`

Note. Repeat above for PumpNodes. 49 is the default number (address) of the PumpNode supplied with the controller.

T.W. DataNodes™

The DataNodes are supplied unprogrammed from the factory. The following describes how to select the various settings and sensor types for each DataNode. Pause, Rain-Off, Program Stop and Frost use N/O cantact input (switch). Water Meter and KWH Meter use counter DataNodes. Moisture is supplied as a complete unit.

Configuring DataNode™ input

From the **"T.W Devices"** display   `ENTER`   Use **< >** keys to scroll to **T.W Data Nodes** display

T.W Data Nodes
<   Press   Enter   >

`ENTER`

Enter DN No.
00   (DN N0. 1—12)

Use numeric keys to enter number   `ENTER`

<   Select Input   >
Nil

Use < > scroll keys to select ➝ **Moisture, Pause, Rain-Off, Program stop, Water Meter, KWH Meter, Frost (1), Frost (2).**   `ENTER`

Configuring DataNode™ input for moisture

When selecting moisture the **program number** for the sensor must also be selected

<   Select Input   >
Nil

Use < > scroll keys to select

<   Select Input   >
Moisture   P-#

Use numeric keys to enter which program to assign to   `ENTER`

Notes on DataNodes

The Pause and **Rain Off** sensors are assigned to programs in the **Inputs menu** page 44.

Water Meter when selected refer to the previous section **Water Meter configuration and program assignment** pages 29, 30.

Frost Sensor (1) will activate frost program 7, Frost Sensor (2) will activate Frost program 8 see pages 27, 28.   *con't next page*

Con't

Moisture sensor preset irrigation override setting see page 45.

Stop Program this is linked to the **Start Program** input sensor at the controller i.e. program/s started by the Start program input sensor are stopped by the **Stop Program** sensor.

View DataNodes

From the **"T.W Devices"** display | ENTER | Use **< >** keys to scroll to "View Data Nodes" display | **View Data Nodes** < **Press Enter** > | **>**

ENTER | **< Add. 01   Add. 02 >** **X00 (##)   X00 (##)** | Use **< >** keys to view → Go to **page 45** for details of display information.

Download program settings to DataNodes and Moisture sensors

To download the settings to the DataNode or moisture sensor the DataNode must be connected to the **Two-wire Devices program port** terminals on the controller using the supplied leads.

⚠ **Caution:** Ensure programming is correct before disconnecting from the program port. Once disconnected the device cannot be reprogrammed

From the **"T.W Devices"** display | ENTER | Use **< >** keys to scroll to **Program Data Nodes** display | **Program Data Nodes** < **Press Enter** >

ENTER | **Enter DN Number** **00** | Use the numeric keys to enter the DN number | ENTER

Inputs

Inputs are from switches or sensors. The controller supports analog and digital inputs. Both direct connection to the controller terminal strip and the 12 field DataNodes.

Pressure

This sensor will either stop irrigation high and low pressure, or skip a station after a pre-set time delay. Digital sensors can be connected to the terminals [HP], [SP] and [LP]. The **[PRE]** terminal at the controller is for an analog 4-20 ma pressure sensor.

From the **Time and date** display scroll | **>** | **INPUTS** < **Press Enter** > | ENTER | **Pressure Sensor** < **Press Enter** >

ENTER | **Pressure Sensor** **Digital Inputs** | If an analog sensor is used | ON/OFF SHORT CUT | **Pressure Sensor** **L### S### H###**

Use keypad to select pressure setting in KPA.
L=Low, **S**=Skip station **H**=High. | ENTER

Note. If analog sensor is not used - Preset sensors can be connected to the controller terminals [HP], [SP] and [LP]. (N/O contacts)

To program delays for sensors go to the **SYSTEM SETTINGS** page 37.

Notes. The **Skip Pressure** function may not hydraulically activate a valve quickly enough as some pumps have steep pressure curves. For example, a skip and high pressure setting may only be 100kPa apart. This differential may only take a couple of seconds to reach the high pressure cut-out point when pumping against a closed head. If this is the case the time for the electrical signal to be initiated and a valve to electrically and hydraulically respond may be beaten by the high pressure cut-out. A pressure sustaining/relief valve can be installed that is sized to slow down the pressure increase if a valve fails to open but not completely prevent a pressure increase that would override a HP cut out in a closed head condition.

Program Start Sensor

This sensor will activate its selected programs for their programmed run times. The sensor input is located at the controller terminal [PRS].

From the **Time and date** display scroll   **>** | **INPUTS** / **<** **Press** **Enter** **>** | **ENTER** | **Pressure Sensor** / **<** **Press** **Enter** **>**

> | **Prg. Start Sensor** / **<** **Press** **Enter** **>** | **ENTER** | **Select Programs** / **- - - - - - - - 8** | **ON/OFF** **SHORT CUT**

Use scroll < > keys to next or previous slot and repeat   **ENTER**   **Note.** Program 8 is as default.

Pause Sensor

This sensor will pause its selected programs when running. They will resume at the paused state when the sensor is not active.

From the **Time and date** display scroll   **>** | **INPUTS** / **<** **Press** **Enter** **>** | **ENTER** | **Pressure Sensor** / **<** **Press** **Enter** **>**

> | **Pause Switch** / **<** **Press** **Enter** **>** | **ENTER** | **Select Programs** / **1 2 3 4 5 6 7 8** | **ON/OFF** **SHORT CUT**

Use scroll < > keys to next or previous slot and repeat   **ENTER**

Rain-off Sensor

The Rain-off sensor will switch the programs to a non start condition whilst the sensor is activated.

From the **Time and date** display scroll   **>** | **INPUTS** / **<** **Press** **Enter** **>** | **ENTER** | **Pressure Sensor** / **<** **Press** **Enter** **>**

> | **Rain-Off Sensor** / **<** **Press** **Enter** **>** | **ENTER** | **Enter program No?** / **1 2 3 4 5 6 7 8** | **ON/OFF** **SHORT CUT**

Use scroll < > keys to next or previous slot and repeat   **ENTER**

Moisture Pre-Set

Moisture sensors are pre-set at the controller to override a HydroSector irrigation start time if the pre-set value is reached or exceeded. The controller software checks this setting before each irrigation start.

The sensors are assigned to Programs or HydroSectors. (see next section for HydroSectors)

From the **Time and date** display scroll

| **>** | INPUTS
<   Press   Enter   > | **ENTER** | Pressure   Sensor
<   Press   Enter   > |

| **>** | Moisture   Pre-Set
<   Press   Enter   > | **ENTER** | <   Mois. Sensor   1>
20   (10   to   45) | Use keypad to set range between 10%-70% |

> Set next moisture sensor and repeat as required   **ENTER**

Note. The moisture sensors were calibrated in sandy loam soil. The % moisture readout at the controller may differ with varying soil types. Your preset override can be adjusted to suit your local conditions by adjustments and observation over a period of time.

View Inputs   (inputs on the controller terminal strip)

From the **Time and date** display scroll

| **>** | INPUTS
<   Press   Enter   > | **ENTER** | Pressure   Sensor
<   Press   Enter   > |

| **<** | View   INPUTS
<   Press   Enter   > | **ENTER** | PR   WM   WAHSLP
000   000   000000 |

Display as kPa

0 = contact open

1 = Contact closed

PR	Analog input Pressure	H	High Pressure
WM	(not used this version)	S	Skip Pressure
W	Water Meter no 1	L	Low Pressure
A	Auxiliary Pump	P	Program Start

DataNode status from "View DataNode" display   (from page 43)

< Add. 01   Add. 02 >
X00 (##)   X00 (##)

DataNode address

F1 and F2	Frost sensor 1 and 2
PA	Pause sensor
PS	Program stop sensor
RO	Rain off sensor
WM (xx)	Water meter counter
MO	Moisture sensor

X   not online
Ö   online

00	WM DataNode not counting or waiting pulse
0x	Pulses left in WM DataNode buffer
01	SC DataNode activated
99	SC DataNode not activated
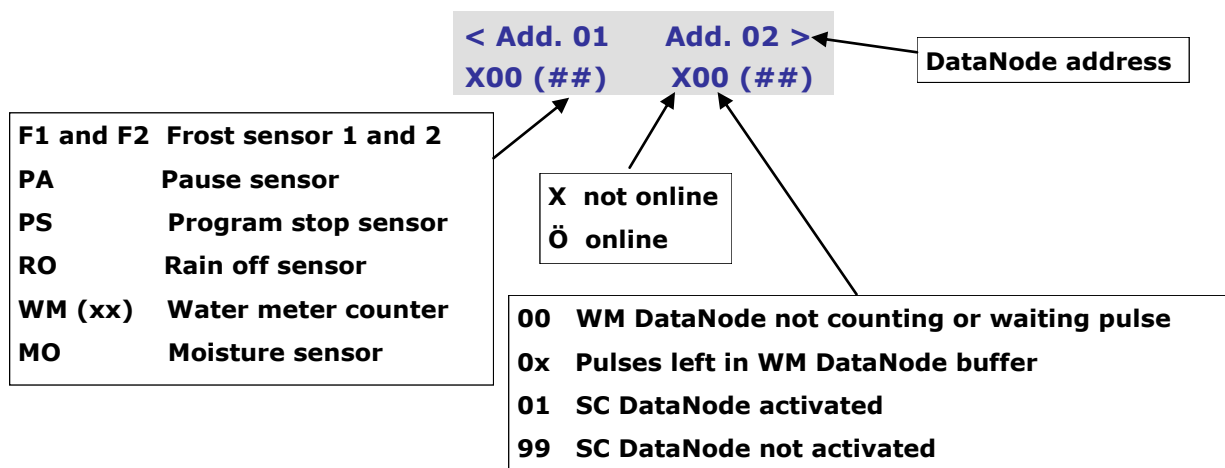
HydroSector™ Program

- The HydroSector program is a conversion of the standard programs to a linked sequence of zones or HydroSectors. Each H/Sector would typically be a number of matched precipitation stations. Each station may have multiple valves.

- The HydroSector can be programmed in time, precipitation in mm or by volume in litres.

- If the Auto programming option is used the total of hours and minutes, mm or litres are programmed for each HydroSector. The program calculates the run time or volume for each valve (in the case of volume) within that HydroSector.

- The program structure consists of 4 programmable master start times. Each HydroSector can be programmed to accept or reject these starts.

- Each HydroSector is programmed with a 14 day calendar.

- A soil moisture sensor can be allocated to each HydroSector and calibrated at the controller to override the irrigation at a programmable set-point at the controller.

- If connected to a pulse output on a water meter a total of water used is stored and a weekly water usage can checked against a running annual water budget for the system. The SDS software program at your laptop or Central PC will advise if the budget is on target. (some versions only)
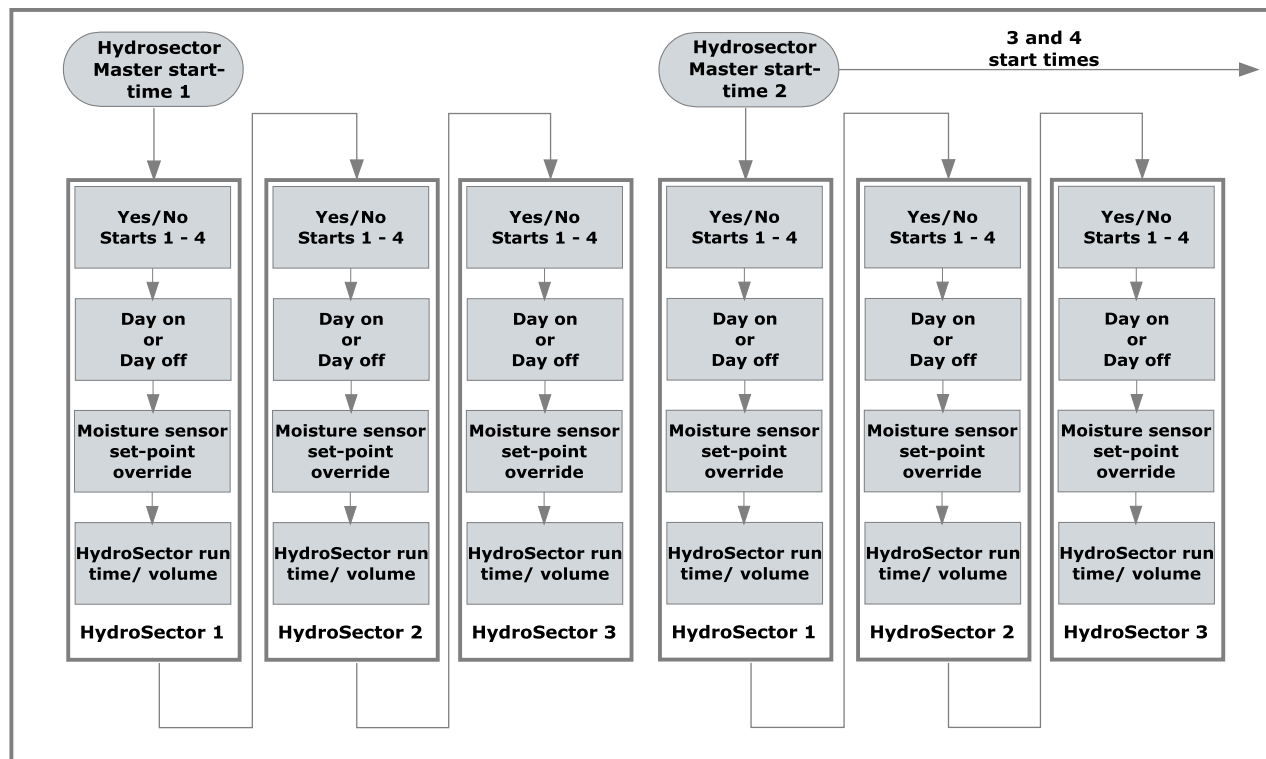
HydroSectors will run in sequence. If an override is triggered e.g. Moisture, day off, non acceptance of a master start time 1—4, the next H/sector in the sequence will start.

Çon't **HydroSector Program**

Before commencing go to **SYSTEM SETTINGS** and enter the precipitation rate for each HydroSector™ in use. See page 37. The default setting is 12mm.

Converting programs to HydroSectors and setting Master Start Times

From the **Program Entry** display scroll **>** | **HydroSector Prog** **< Press Enter >** | **ENTER** | **Assign Programs** - - - - - - - -

This converts a standard program to a HydroSector | **ON/OFF SHORT CUT** | **>** | **ENTER** | **< Set Start time 1 >** **None**

These are the 4 master start times of the H/Sector Program | **ON/OFF SHORT CUT** | **< Set Start time 1 >** **00 : 00 : 00 Am** | Enter start time from keypad hr : min : sec

AM PM COPY | **>** | Repeat procedure for more start times | **ENTER** | **Auto programming** **< Disabled >**

Auto Programming feature

The auto programming option assigns time or volume of water to each valve & stn within the HydroSector from a total value entered for each H/Sector. It is **recommended watering be set by precipitation or Time.** Only use volumetric option on a matched precipitation system if the system has been designed for volumetric watering. I.e. (matched flow for all valves within a station)

If Auto programming is not selected go to **Program Entry** display and program as normal.

To enable Auto-program | **>** | **ENTER** | **Auto programming** **< Enabled >** | **ENTER** | **< Hydro Stations >** **H# From ## To ##**

Enter station numbers from keypad | **ENTER** | **< Total Water >** **H# 00 : 00 : 00 100%** | Use numeric keys and enter time

To program by precipitation | **ON/OFF SHORT CUT** | **< Total Water >** **H# ## mm 100%** | Use numeric keys and enter mm. Run time can be checked by pressing on/off

Rewriting Progs ......Please wait | For the volumetric watering option this must be selected in the **Program Entry** menu

The HydroSectors are now selected. Stations have been allocated and watering times and/or volumes have automatically been calculated for each valve/station and start times have been programmed.

The next phase enters into each HydroSector its start time acceptances of the 4 master start times and the 14 day calendar for each of the sectors. Press the **Back** key to the **Program** display and continue as described in the next section.

Çon't **HydroSector Program**

Days on/off and Start time acceptances of Master starts

Program < **Press Enter** >	ENTER	**Program Entry** < **Press Enter** >	ENTER		

Enter Program No? #	Use numeric keys to select	ENTER	**< H# Mode >** **Normal**	

If no loop prog required	ENTER	**H# Master Pump** **Default**	ENTER	**H# Water Days** **SMTWTFS SMTWTFS**	**>**

ON/OFF SHORT CUT	ENTER	**< H# Start Time 1 >** **None**	On/off key to select starts	ON/OFF SHORT CUT	Use **< >** keys to select more starts	ENTER

< P# Option > **Time**	ENTER	The display will show the time or volumes allocated to each station. Water volume will be calculated depending on number of valves allocated to that station

Use **< >** keys to view stations	ENTER	**H# Station Delay** **00 : 00 Ms**	If required use numeric keys to enter station delay mins : secs.

ENTER	**H# Total Water** **00 : 00 : 00**	ENTER

If the **auxiliary pump** option is used, the following will display:

H# Prewet Delay **00 : 00 Ms**	Use keypad to enter delay time min : sec	ENTER	**H# Aux. Pump** **default**

To select DataNode other than default (50)	AM PM COPY	Use keypad to select	**>**	**<H# Aux. Stn 01>** **00 : 00 :00 100%**

Use keypad to enter auxiliary stations run times hr:min:sec	**>**	Repeat for next stations	ENTER

Note. The auxiliary pre-wet is the time the station runs without the dosing pump (auxiliary) running. The auxiliary run is the dosing pump run time. The balance of the time on the stations watering time is a post-wash time.

Factory Default Reset (resets controller to all factory default settings)

Caution; disconnect all devices from the serial and USB ports, reconnect after reset.

From the current **Time and Date** display **< >** scroll	**SYSTEM SETTINGS** < **Press Enter** >	ENTER	**Flow Meter pulse** < **Press Enter** >

>	**Factory Default** < **Press Enter** >	ENTER	**Default < 1234 >** **WM Config <6021>**	Key in **1234**

Fault finding the controller

The SD-50 controller has been designed for ease of service and repair. The controller does not require a service technician to repair. If you have had any experience in replacing PC plug-in cards you will be able to service the controller.

The design of the board is such that plug-in PCB modules can be quickly and easily replaced.

The principle components of the controller consist of:

- A mother board which contains the internal PCB power supply, lightning protection and plug in module interfaces.

- A plug-in logic board which houses the microcontroller, timing clock, memory and Bluetooth module.

- A plug-in output board which drives the two-wire network.

- A plug-in keypad assembly which incorporates the display.

Page 12 & 50 of this manual indicates the various key components and also the LED indictors and their normal status. These are used to initially pinpoint the fault condition if they display abnormal.

Routine things to check if the controller is suspected as faulty before further investigation.

- Is the power switched on at the controller.

- Test the power supply to the controller with a DC volt meter. It should read 36VAC

- Check that the terminal strip is not loose.

- Check that the terminal screws are firm but not over tight

- Check that the wires have not pulled away from the terminal strip by lightly pulling on them.

- Check the controller fuse.

- Check the current draw at the controller **Information** menu. Normal current draw is 6mA per coil at idle, 120mA running.

- Try re-setting the controller to factory default setting, and re-program, see page 48.

Replacing the plug-in modules.

Refer to next page for correct PCB LED indictors.

Before any module is replaced turn the power off to the controller. Always hold the modules at the edge of the PCB boards. They are designed to easily plug in so no force is required. Make sure the connectors are aligned and no problems will be encountered. It is often easier when replacing the logic board to unplug the key board display panel to give easier access. **Do not** over tighten the four retaining screws at each corner when securing the keypad back in place, just lightly nip the screws up to the panel.

The motherboard has **5 screws** locating it to the base of its enclosure, make sure all are removed when replacing the board and it will lift away easily.

Con't **fault finding the controller**
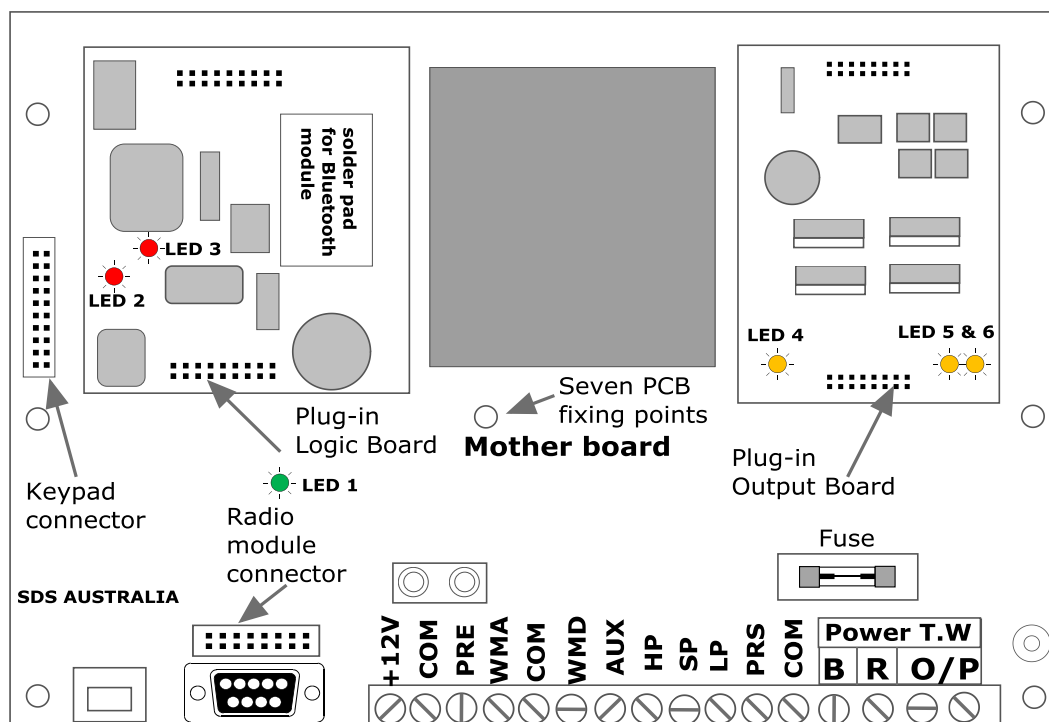
If it is suspected a fault is present at the controller and not in the field cabling or DataValves, proceed as follows.

1. Remove the four front keypad panel screws and carefully lift to one side, press any key on the keypad to ensure the output is switched on. Observe the six LEDs for correct operation.

LED 1 should be on. If it is not check the fuse. If this is OK test for DC voltage at **B R** terminals. If this is OK replace the mother board.

Note. **LED 1** indicates normal operation of the PCB motherboard power module.

2. If **LED 1** is on proceed to **LED 2 and 3.**

LED 2 should be on, **LED 3** should flash. If not correct on both LEDs replace the plug-in logic module.

Note.

LED 2 indicates power to the Logic module. **LED 3** indicates the microprocessor timers are working.

3. If **LED 1, 2** and **3** are all correct proceed to **LEDs 4 , 5** and **6.**

This test assumes all other LEDs are normal.

LED 4 should be on, press any key at the keypad and **LED 5** and **6** should activate. If this is not correct replace the plug-in output module.

Note.

LED 4 indicates power to the output board, **LED 5** and **6** indicate power out from the output module.

Con't **fault finding the controller**

Illustration below with the plug-in logic module output module and radio module installed.
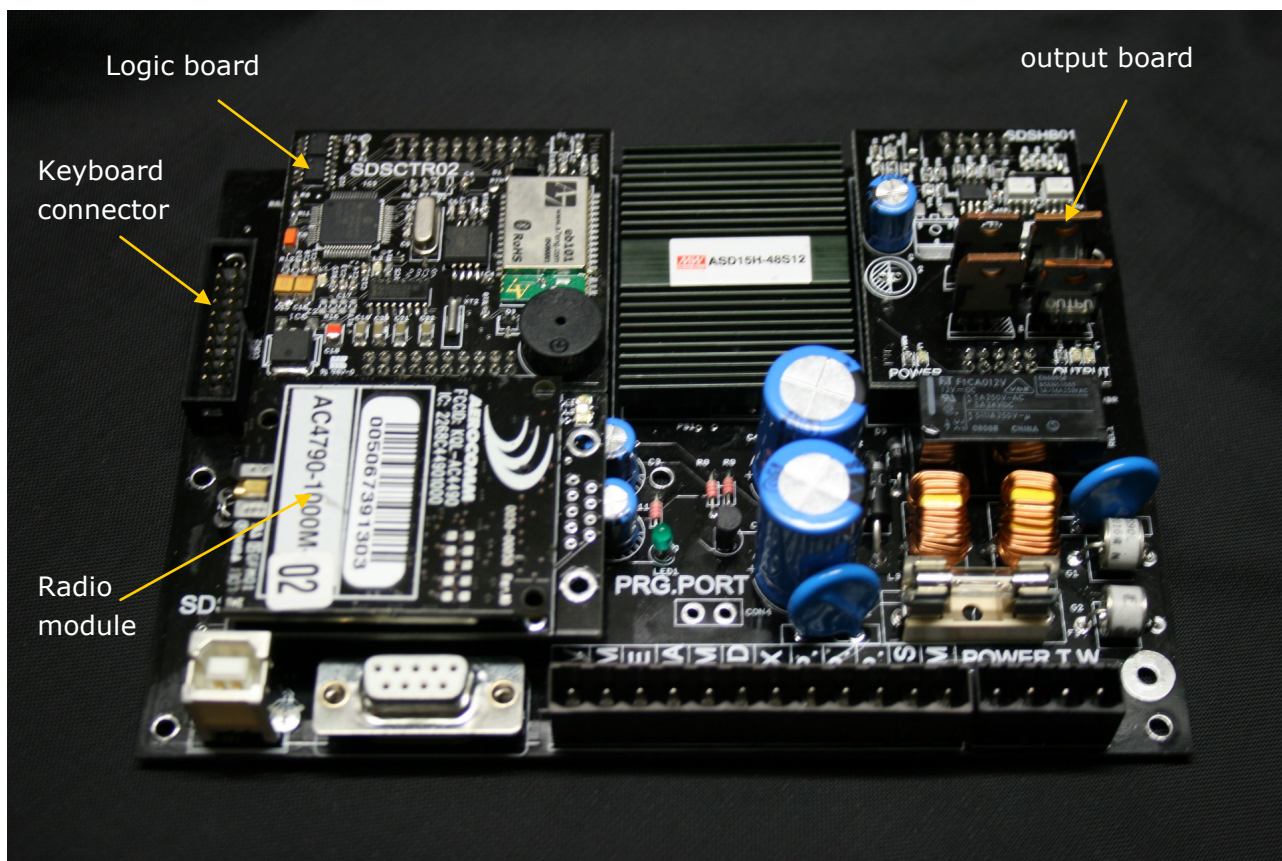
Fault finding field valves and cable

The patented two-way communication between the valves and the controller makes it possible to instantly observe the performance of the field valves. By doing this, faulty DataCoils™ and cable problems are quickly identified.

In the controller menu **TW Devices,** the **Valves On-Line** function can be accessed. This will display all valves within the system and display if they are on-line or off-line.

The communication protocol is biased towards the forward channel i.e. switching the valves. The back channel is split into two separate areas of reporting status of the valves and the DataNode sensor function.

The status reporting of valves on-line or off-line can be relied upon if the two-wire cable is installed correctly and has good wire connections with no leakage to earth caused by a breakdown in the wire insulation or sub-standard installation.

Current Draw

The DataCoils and DataNodes draw 2mA when not operating. DataCoils (S), when operating, draw 110mA—130mA, The Extend model DataCoil (E) draw 30mA when operating. If a total current draw exceeds **1500mA** the controller will indicate a short circuit condition. If the total current load exceeds **900mA** the green two-wire LED will flash. This condition will be either partial short circuit or could indicate the short is at a distant point in the cable from the controller.

⚠️ **Cable problem located here**

X **Valve not responding status off-line**

The valves can also be inspected for correct operation from the top of the valve coil. When the two-wire cable is powered up the red LED will flash. If the valve is switched on the orange led will remain on.

If some valves report as being off-line and the system still operates correctly this will indicate a degrading of the communication either by incorrect cable and/or connector installation or cable damage.
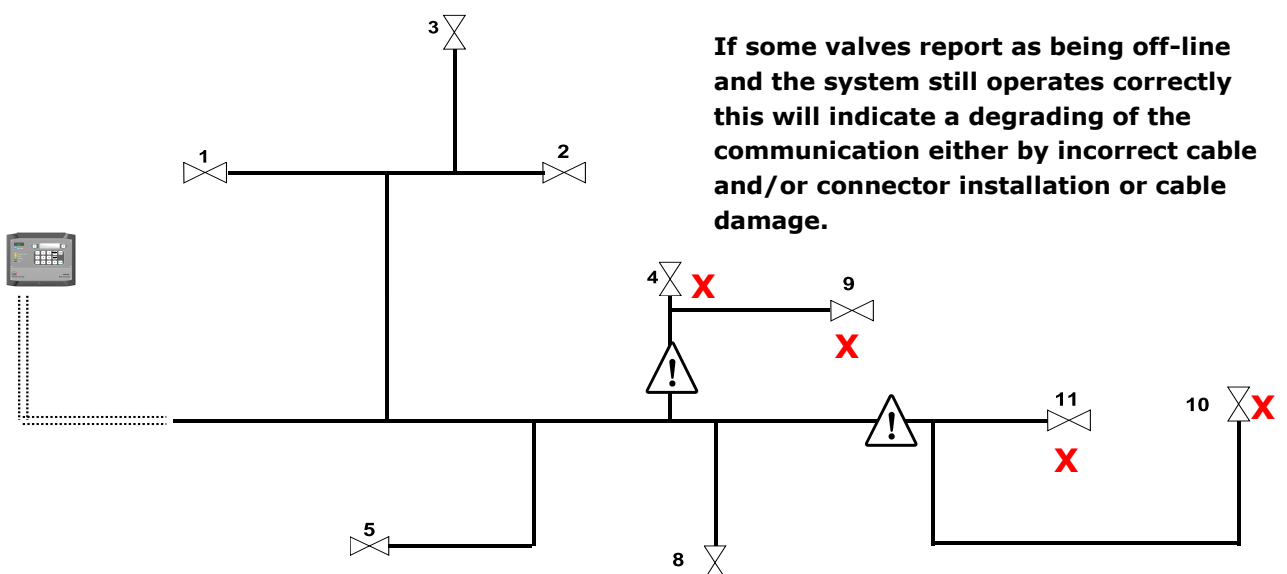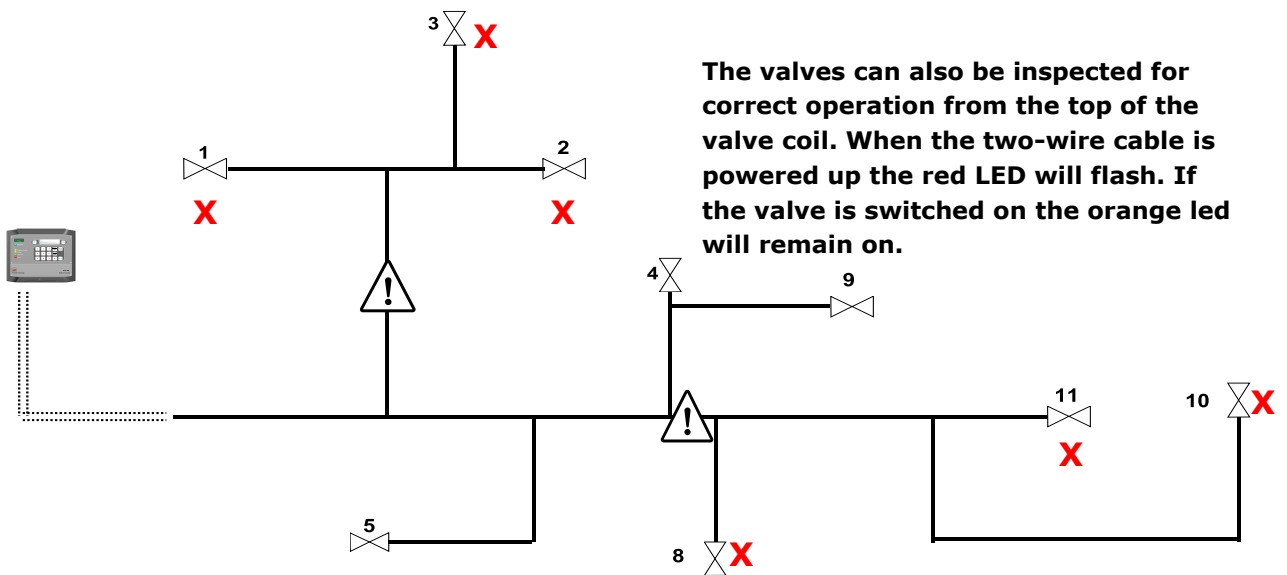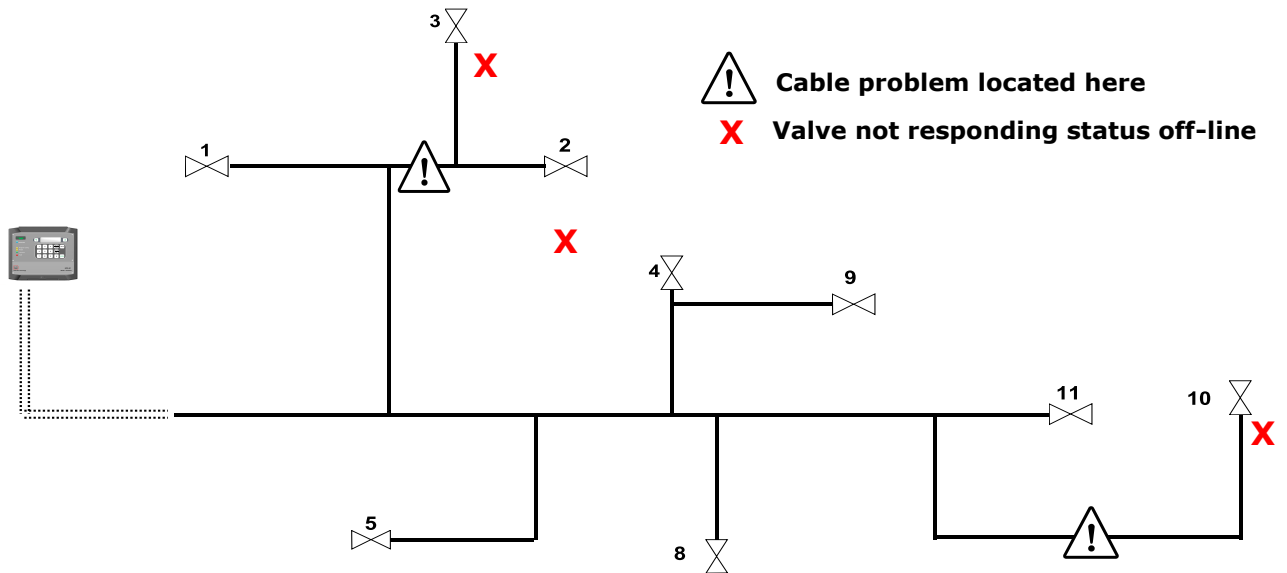
Short circuit fault finding of TW field devices.

This fault finding operation requires a clamp-on milliamp meter with a range down to 20 milli-amps and a SD Systems resistance box service tool model SD-RB. If this is not available, in an emergency a suitable 5-10 watt 250 Ohm wire wound resister can be connected in series with the two-wire cable. Use caution and due care as a resistor can reach temperatures that will cause skin burn and melt plastics if in contact with them.

A malfunction of the system is evident when the red LED indicator is on. Press the ENTER key to display the fault. In this instance we are describing the detection of a short circuit fault.

1. The DataCoils™ model SD-DAC have, as a precaution, an internal device that will short circuit if excessive voltage is present, this reduces a "daisy chain" effect of electrical surge damage to multiple DataCoils™ and other TW devices in the event of a lightning strike.

2. When a short circuit is present the electrical current load on the two-wire cable must be reduced to a level where the circuit breakers do not reset, thus enabling electrical current testing of the system.

The electrically short circuited device must be located and replaced or if a cable short, repaired and tested. If a TW device is not immediately available, disconnect the shorted device from the two-wire cable until it can be replaced.

To trace the source of an electrical field short circuit proceed as follows:

Connect the two-wire cable to the SD Systems resistance box service tool SD-RB to reduce the current within the cable network. At the controller, program a valve from the **TW Devices** menu to run for a suitable period of time, this will power-up the cable network for fault detection.

A suitable low current reading clamp meter is used to trace the source of the short circuit. To detect the high electrical current source, clamp the meter over **one wire only** at a convenient location normally at the valves where the inner insulated wires can be accessed. Also any "T" branches of the cable network should be tested to follow the high current and hence the short circuit.

When tracing a short circuit the clamp meter will indicate a higher current flow before the short circuit . If the meter displays no or low current flow you have bypassed the short. Once zeroed into the suspected short circuit location clamp the meter on one of the two-wires between the device and the two-wire cable to confirm this is the faulty device. In some instances the short circuit could be in the two-wire cable. A cable fault is usually isolated to an area between two valves. Refer to the following examples:

(1)

Start at controller and work out from there to determine direction of short circuit

Low current

To controller TW output

Install service tool SD-RB at controller

Short circuit this way
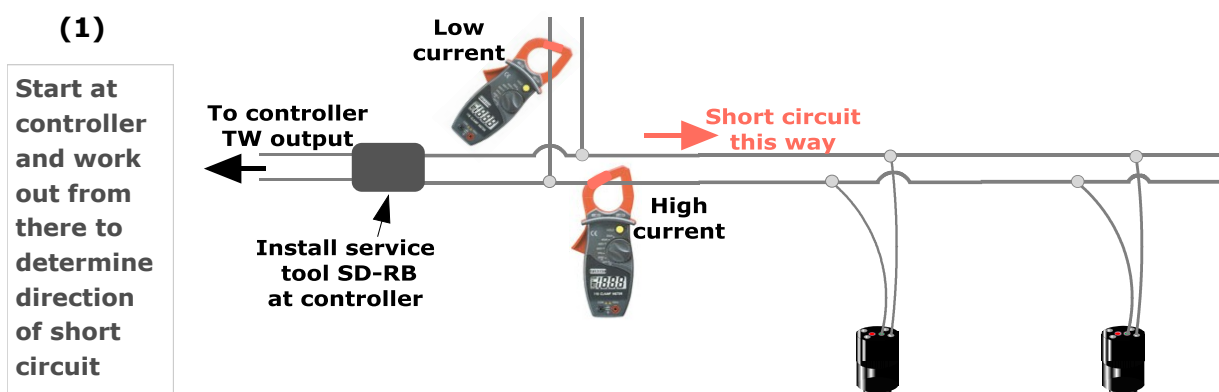
High current

Typical fault finding scenario of short circuit detection in the field.

(2)

General area
of short is
established

To controller
TW output

Install service
tool SD-RB
at controller

High
reading

Short circuit
is located in
this area

Low
reading
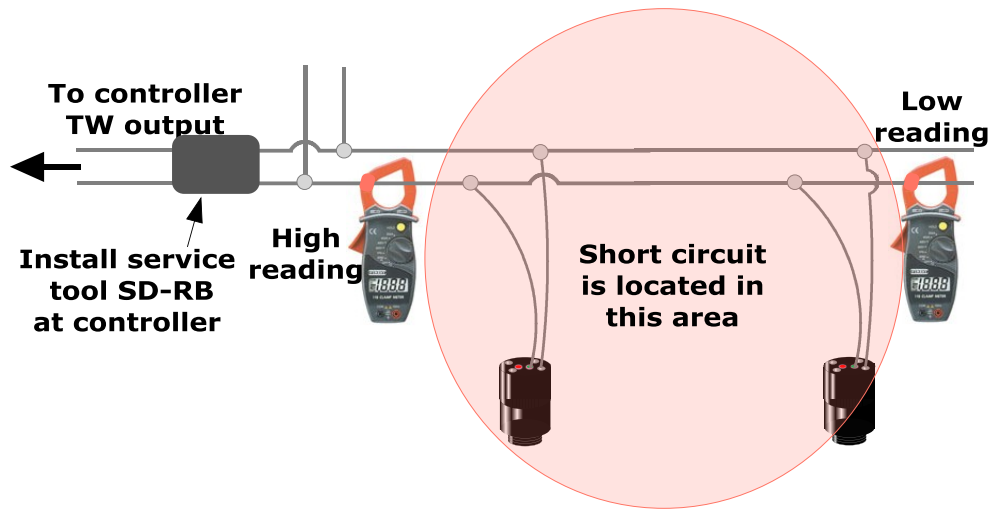
(3)

Test TW Devices
within this area
for short circuit
(high current
draw)

To controller
TW output

Install service
tool SD-RB
at controller

Low
reading

If High
reading.
Replace

✔
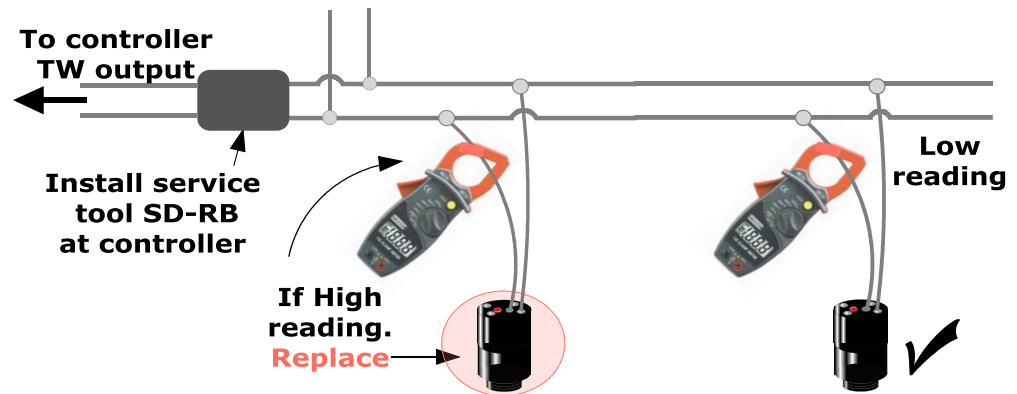
(4)

Test cable
again, for
high reading.
To establish
if a short still
exists.

To controller
TW output

Install service
tool SD-RB
at controller

High
reading

Short circuit
located in cable

Low
reading
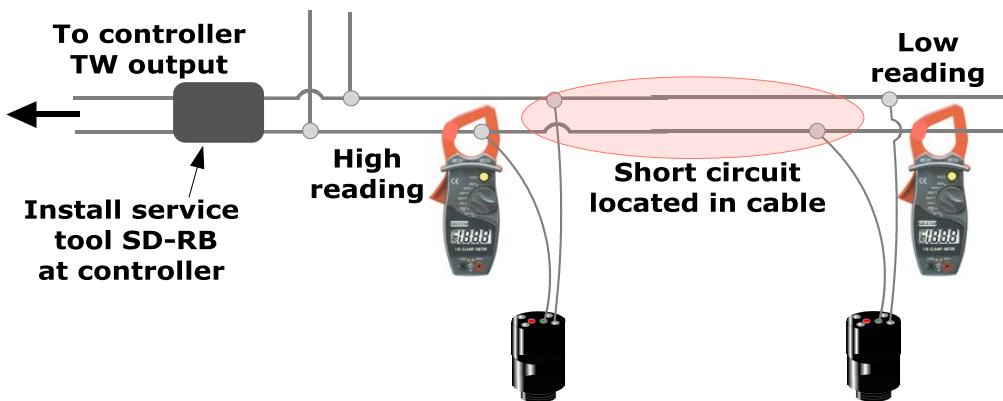
(5)

If cable fault
exists zero
in to the
short or call
*professional
cable test
company for
fault location
and repair.*

To controller
TW output

Install service
tool SD-RB
at controller

Short
circuit

High
reading

Low
reading
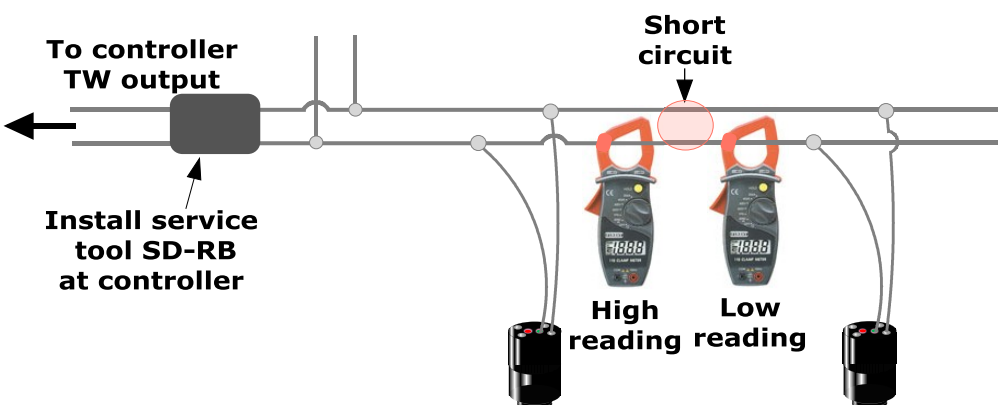
Con't

The example shown is typical of a fault finding exercise to locate a short circuit TW Device and/or a cable short circuit.

When the system has been repaired the current draw can be conveniently checked from the controller itself, see **page 36**. Coils and DataNodes in their quiescent mode draw approximately 2mA so the amount of electrical current consumed should approximately coincide with the number of devices connected. Remember to make sure the two-wire is active by pressing any key on the keypad when doing this check.

<div align="center"><u>**Fault Finding Chart**</u></div>

Upon initial installation, great care should taken to avoid grit contamination entering the DataCoil™ plungers. Ensure the system is properly flushed before start-up to avoid dirt/grit contamination of the piping. If a coil malfunctions but it is reporting as on-line with the correct LED indication it is almost certain that the coil plunger is jammed by grit. Remove from the coil, clean the plunger and internal coil chamber and reinstall. It should be noted that fine sand grit can often be difficult to see and only becomes evident by feel.

⚠ **Do not stretch the plunger spring** as the coil's electrical efficiency will be reduced.

Controller Red LED is on	Water meter stopped counting	Check water meter output and connections
Controller Red LED is on	Pressure fault, high, skip or low	Rectify hydraulic problem
Controller Red LED is on	Electrical short circuit in two-wire	Trace short circuit
Green LED flashes	System electrical current draw is exceeded beyond 900mA	Check for partial short circuit and all two-wire devices for fault.
No display	Faulty power supply	Test power supply input, should be 36VDC
	Faulty controller module	Observe all PCB module LEDS for correct indication
The controller is erratic in operation or appears to have an intermittent fault.	Loose electrical connections	Make sure all electrical connections are correctly terminated.
	Electrical leakage to earth	Inspect cable connectors
	Power disruptions	Check the controller log for electrical outages.
	Electrical, EMI interference	Are there any high voltage electrical switchgear close by?
		If variable speed pump drives are used they must be installed strictly to the manufactures guidelines.
	Faulty power supply	Test the controller power supply.
	Faulty controller module	Observe all PCB module LEDs for correct indication

Con't

All valves do not operate but controller seems OK	Not programmed correctly	Check - rain off, start time, pause, run times and calendar
	No electrical output	Test for voltage 34VAC output. Make sure the output is active by depressing any key before testing.
	Faulty output module	Ensure the output PCB module LEDs are correctly indicating.
	Faulty field wiring or connector	View valves on-line at controller to determine if wiring break or faulty field wiring connector.
A valve will not activate	Faulty field wire connector or cable damage	View wiring list at controller, then valves on-line at controller to determine position of cable fault.
	Valve not assigned	Check wiring list at controller
	Faulty DataValve	Inspect valve LED indictors for correct operation.
A valve stays on	Dirt contamination in DataCoil	Unscrew from valve and clean. Care with "O" ring and spring. <u>Do not cross thread or over tighten on valve. Do not stretch the spring</u>
	Faulty DataCoil	Inspect valve LED indicators for correct operation
Pump will not start	Faulty PumpNode	View TW Devices "Valves online" menu to check if the PumpNode address is listed as being online.
		If not listed as online check if the PumpNode LED flashes (controller must be active). If no flash and connections are verified as OK replace the PumpNode.
	Test for correct LED PumpNode operation.	LED "flashes" when the two-wire cable is electrically powered by the controller. LED remains "On" when the pump is activated by the controller
	Incorrect pump-start relay.	Check pump-start 24Volt relay for correct type, relay coil rated at 65mA max. (Omron LY2 recommended). Change relay if necessary.
	PumpNode output wiring too long.	Pump-start relay wiring to PumpNode to be no more than <u>1 metre long.</u> Rewire if necessary.

The model SDS-50 controller has a **maximum capacity** to operate 4 valves at one time with an additional master valve or pump. The charts below are based on model SD-DC DataCoil™

distance metres — **Guide to distance/cable size for reliable valve activation at 840 kPa**

4 mm²
2.5 mm²
1.5 mm²
1 mm²

number of valves + 1 master valve operating simultaneously

distance metres — **Guide to distance/cable size for reliable valve activation at 750 kPa**

4 mm²
2.5 mm²
1.5 mm²
1 mm²

number of valves + 1 master valve operating simultaneously
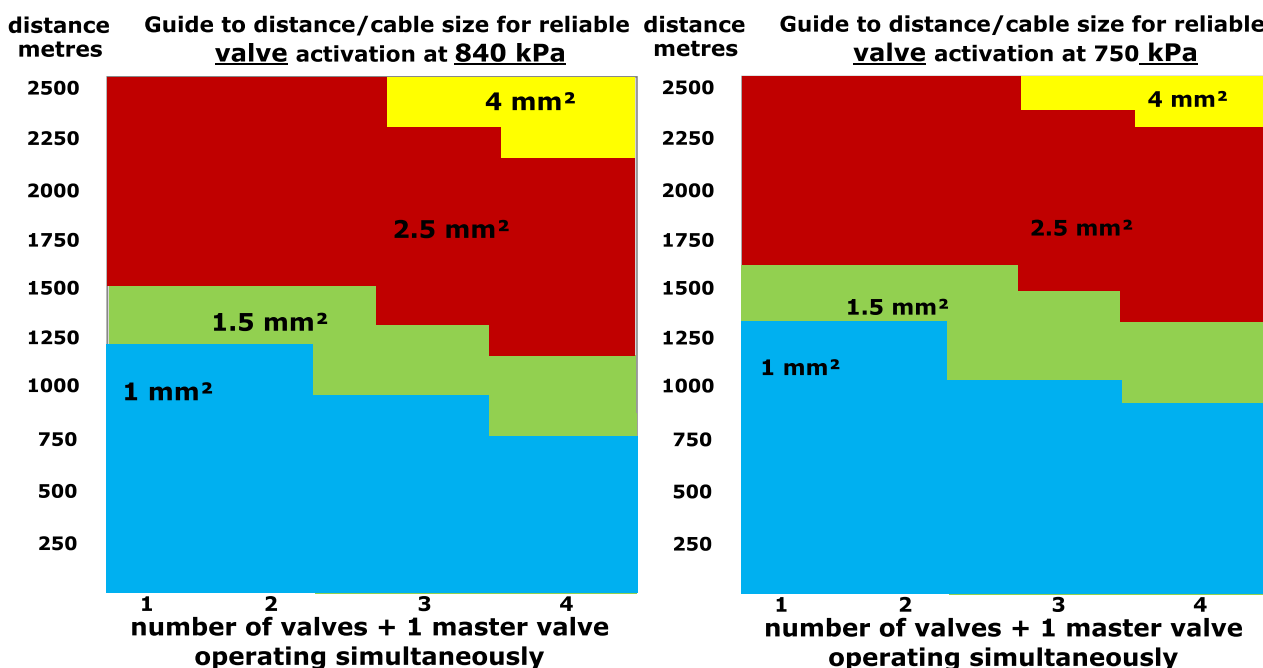
The above charts show the varying degree of performance in relationship to number of valves running, cable size, distance and operating pressure. The tests in the two above charts were performed using actual cable lengths and in workshop test conditions. High resistance and intermittent connections can effect the performance of the back-channel and valve actuation.

distance metres — **Up to 840 kPa**

4 mm²
2.5 mm²
1.5 mm²
1 mm²

valves

Guide to distance/cable size when reliable back-channel operation is important
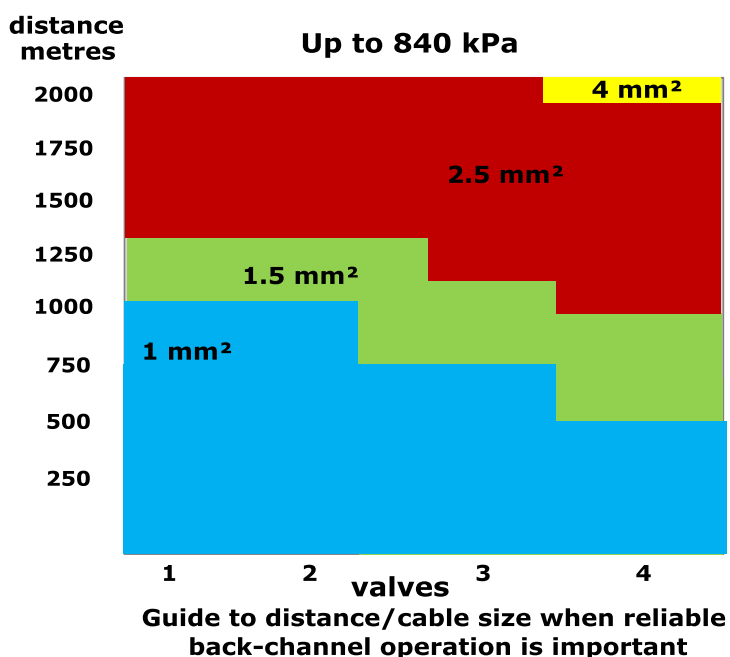
This chart should be used for optimal back-channel performance and when water meters are to be connected along the two-wire cable. The chart is based on three water meters connected to the two wire cable operating simultaneously with 5 switch input DataNodes™.

The tests were performed using actual cable lengths in workshop test conditions. High resistance and intermittent connections can effect the performance of the back-channel.

For optimum performance try and ensure that groups of valves operating at the end of the two-wire cable are split so some operate closer to the controller.

- The controller supports mobile phone Text Commands, SDS Android and SDS iPhone Apps. PC central control via VPN internet connection is supported.

- For the Text commands (page 39) from a mobile phone, no IP address is required at the controller modem. For the Apps and PC control, an IP address is required at the controller and a VPN at the PC and mobile phone.

- The SIM cards for the PC and Apps must support Data and SMS messaging.

- Use SIM card with deactivated PIN number.

Refer to Manual for programming and configuration.
Pages 38, 39, 40

- For set up of IP address and VPN please contact SD Systems. An instruction manual for this is available in the download section of www.signal.com.au

SDS-50 controller

The SDS-50 controller has been tested and verified with the Maxon Intermax EM770W 3G modem.
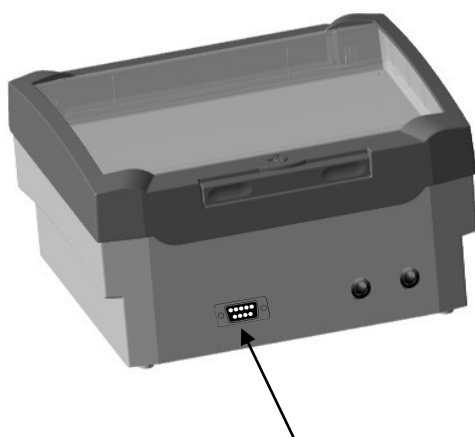
Connect the modem cable to the serial port at the base of the controller. Connect the Red and Black DC power supply to the +12V (red) and Com (black) on the controller terminal strip.

Note.

The controller will auto detect and configure for either GSM/3G modem, radio modem or PC at the serial port.

Caution: If the controller is reset to default factory settings at anytime, disconnect and re-connect device to the serial port.

S/N	Site:	Address no:	GSM/3G:

Stn	Valve/s	Stn	Valve/s
1		25	
2		26	
3		27	
4		28	
5		29	
6		30	
7		31	
8		32	
9		33	
10		34	
11		35	
12		36	
13		37	
14		38	
15		39	
16		40	
17		41	
18		42	
19		43	
20		44	
21		45	
22		46	
23		47	
24		48	

DataNodes

#	
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

program	M/ pump	Aux pump	No pump
1			
2			
3			
4			
5			
6			
7			
8			

Default pump settings

1-8	49		
1-8		50	

NOTES.

HydroSector Program

program	As HydroSector	Precipitation rate	Moisture pre-set	Tick days on S M T W T F S S M T W T F S	Tick starts selected 1 2 3 4
1					
2					
3					
4					
5					
6					
7					
8					

Prog.	Total run time	Total litres	Precipitation: mm
1			
2			
3			
4			
5			
6			
7			
8			

HydroSector Master Start times

1.	2.	3.	4.