



Installation, Site Registration, Website set-up and Operation Manual



IMPORTANT All work must be carried out by a qualified person or persons. It is advisable that both electrical and pump equipment and installation expertise are used.

Successful use of this product requires knowledge of pump and borehole installation, communication systems, field instrumentation and web site navigation, as well as user registration.

Contact SMARTA for the required training.



1 Compatibility

SMARTA is compatible with all Franklin Electric SA (Pty) Ltd SubTronic¹, Blac Bocs and Control Bocs Plus models and can log all electrical parameters as well as provide remote control (ON/OFF) and condition logging. SMARTA is compatible with all other DOL and generic motor controllers using the SMARTA Logger and Reader system. In most cases ON/OFF control and electrical parameter logging, including water level, water pressure and water flow measurements are possible, provided that potential free auxiliary control inputs and outputs are available. Field instruments are optional.

Three variants of the SMARTA logger system are available:

Description	Stock Code	Comments
SMARTA Logger for SubTronic and Blac Bocs motor controllers	SL001	All data including electrical parameters and field instrumentation available with pump control
SMARTA Logger for DOL Starters	SL002	All data including electrical parameters and field instrumentation available with pump control
SMARTA Logger for Generic motor controllers	SL003	All data including electrical parameters and field instrumentation available with pump control
SMARTA Motor Control and Logging System	SL004	All data including electrical parameters and field instrumentation available with pump control
SMARTA Logger for solar pump installations	SL005	Release Sep 2018

2 General

The information in this installation instruction form an integral part of the equipment and describe its safe and intended use. Keep this instruction in the immediate vicinity during the installation. Hand the installation instruction to the subsequent owner or installer. The instructions and specifications only apply to the equipment described in the installation instruction. Make sure that the installation instructions are understand as technical changes may result in differences between the manual and the actual equipment. Technical changes may be made without notice in the interest of product development. Pictures and sketches may differ from the actual equipment supplied.

3 Safety Instructions



DANGER!

Mount SMARTA product in an appropriate location, orientation and position. Do not modify the unit electrically or mechanically. Do not remove any parts of the SMARTA unit. Never install a unit that is connected to a known faulty control box. Ensure to switch-off all incoming power prior to installation.

Ensure the no-one can switch the power on while work is carried out. Never work on electrical systems during a thunderstorm. Ensure that all connections have been checked. Read the Installation and User Manual carefully prior to installation, commissioning and website registration. All work must be carried out by a qualified person or persons. It is advisable that both electrical and borehole equipment and installation expertise are used.

¹ SubTronic, Blac Bocs and Control Bocs Plus are the property of Franklin Electric SA Pty (Ltd)

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4 Layout of this manual

This manual is organised in the following manner by chapter (see the Table of Contents):

1. Check the compatibility of the purchased SMARTA System – does it fit the installation
2. Observe the General guidelines
3. Observe the Safety Instructions
4. Layout of this manual
5. Unpack all equipment and check that the required tools are available.
6. Do the mechanical installation.
7. Do the electrical installation.
8. Install field instrumentation, where applicable.
9. Power up the installation.
10. Observe the SMARTA Logger status.
11. Load Telegram to obtain notifications and communication.
12. Confirm or set up your account on the SMARTA Logger website
13. Set up the website for the installation.
14. Operating and using the SMARTA website.
15. Notes

5 Unpacking the SMARTA Logger and logging system and identifying the model

The purchased item contains the following parts:

- SMARTA logger complete with all cabling
- Infra-red connection module
- Installation and User Manual

Make sure that all items are received. If the installation requires additional optional extras such as field instruments, control panels etc. make sure that all items delivered and/or invoiced have been received.

Check that all the necessary tools, consumables, spares, fixtures and other items are on site prior to commencing with the installation.



Figure 1 Unpacking the SMARTA Logger

6 Mechanical Installation

- Drill 2 X 20mm holes at the base of the existing pump control box or control panel. Fit the glands supplied. It is very important to ensure that all enclosures (SMARTA Logger and pump control box) are sealed after installation to avoid ingress of foreign matter and moisture. All glands not used, should be blanked off. Avoid damp locations. Do not mount in direct sunlight.
- Do not install the SMARTA unit if the existing control box or control panel installation, wiring or conditions are of dubious nature. Arrange repair or replacement of existing installation shortcomings.



- Fit the SMARTA enclosure not more than 1 meter away from the pump and motor control box or control panel. Make provision for the interconnecting wiring between SMARTA and the control box or control panel. All wiring should be fixed and not left too hang loose. If necessary, provide a fixing means for the interconnecting wiring.
- DO NOT DRILL HOLES INTO THE ENCLOSURE TO MOUNT. WARRANTY WILL BE VOID SINCE ENVIRONMENTAL RATING WILL BE DESTROYED.

- Use the mounting template and means shown in Figure 2. It is advisable to mount the enclosure on a flat surface or to use the optional bracket system available.
- Other enclosures are also available. Mount all enclosures according to instructions and ensure that the environmental integrity is retained – a minimum of IP54 is required for any SMARTA installation.

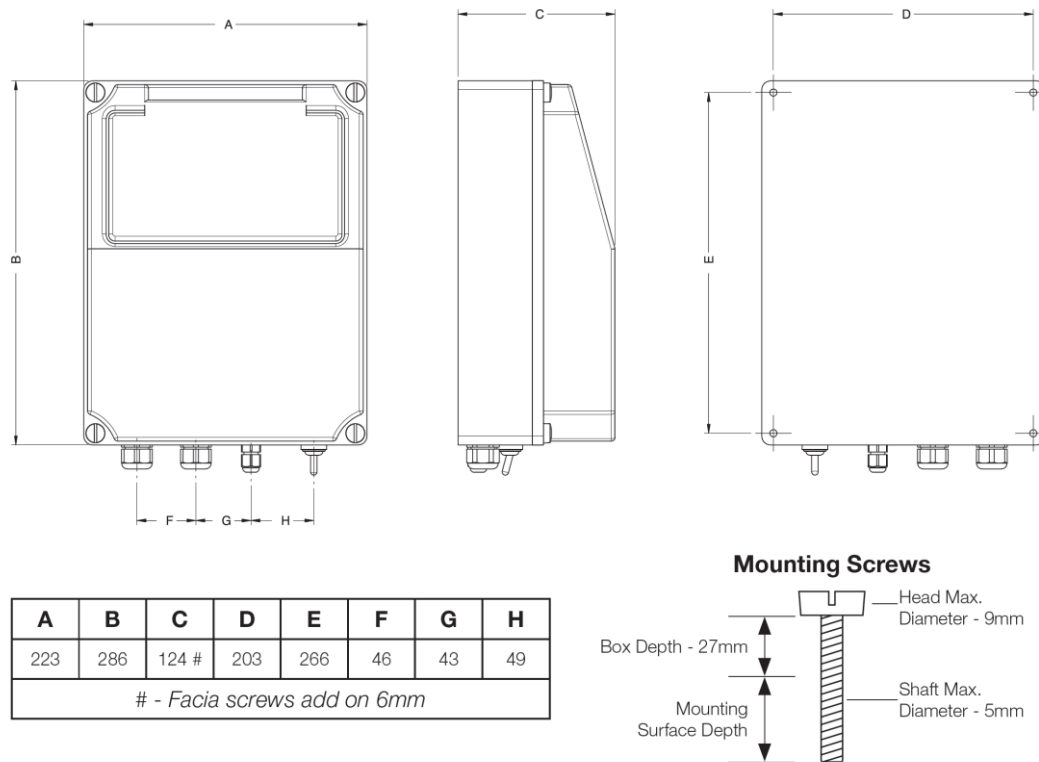


Figure 2 SMARTA Logger mounting guide and information

7 Electrical Installation

7.1 SMARTA Logger for SubTronic & Blac Bocs motor controllers

- See Figure 3 (SubTronic) and Figure 4 (Blac Bocs) for the appropriate wiring diagrammes.
- Connect the SMARTA logger power supply to 230Vac.
- Connect the green and yellow wires of the supplied multi core cable in parallel to the pump control box auxiliary or switch ON/OFF input terminals. The SMARTA Logger control (remote switching function) should be connected in parallel to the existing control box ON/OFF switch. The SMARTA logger is supplied with a local ON/OFF switch to disable remote operation if required.
- Do not lengthen the control wires supplied. External electrical noise can influence operation and cause spurious switching.
- Other control switches such as level and/or pressure control should be wired in series with the SMARTA Logger control wiring.
- Fit the bracket supplied over the infra-red port (2 X LEDs) of the control box.
- Use the multicore cable provided with 4-way terminal block to connect the control box infra-red port to the SMARTA logger.
- Check the wiring connecting the control box and the SMARTA logger. See Figure 3 and Figure 4.
- See Figure 5 to Figure 12 for a typical installation example.

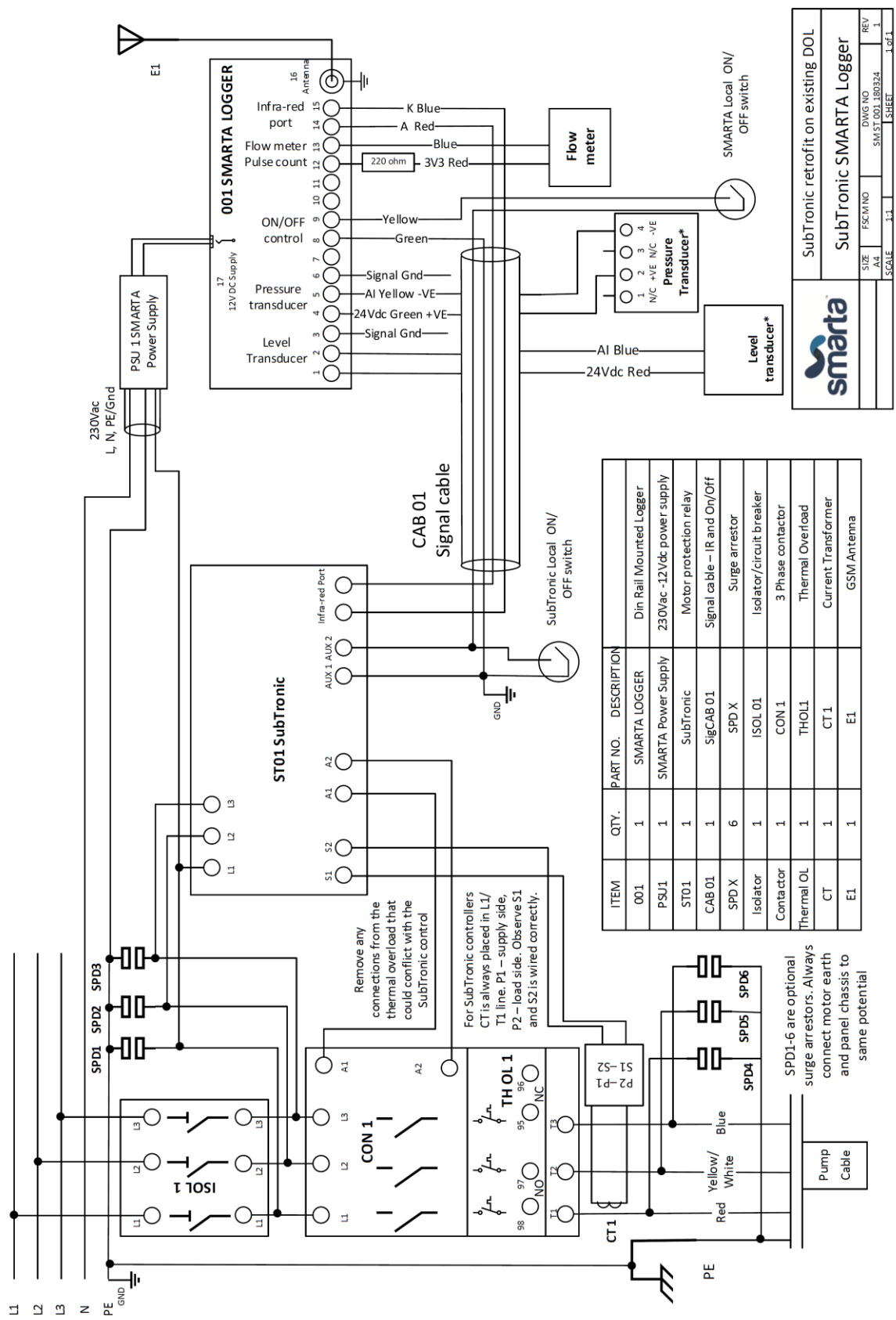


Figure 3 Electrical wiring diagramme - SMARTA Logger for SubTronic

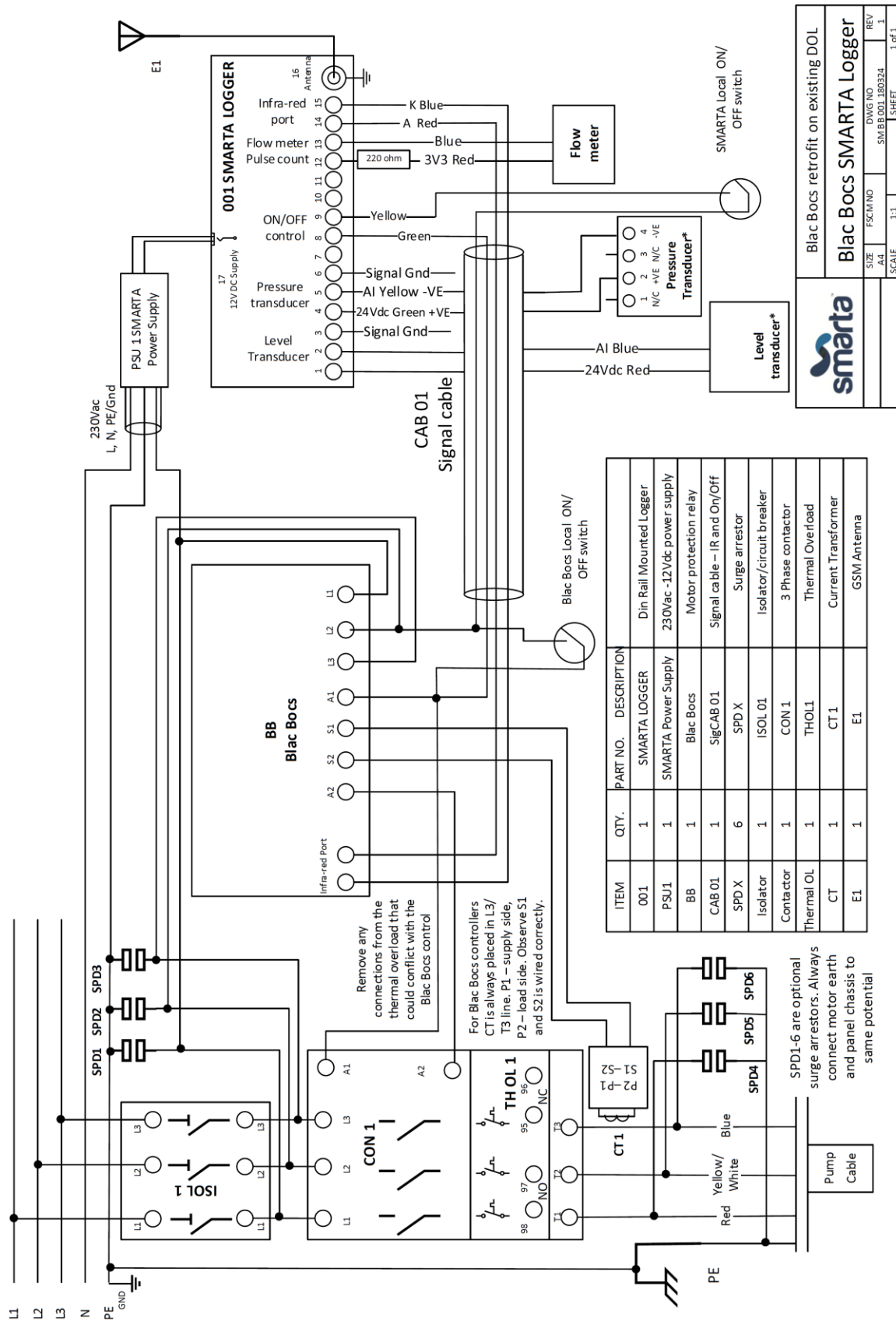


Figure 4 Electrical wiring diagramme - SMARTA Logger for Blac Bocs



Figure 5 SMARTA Logger (Model SL001) installation example



Figure 6 SMARTA Logger terminals



Figure 7 Mount the SMARTA Logger within one meter of the pump controller to avoid noise interference



Figure 8 Pump control box/panel switch input



Figure 9 Fit infra-red bracket to SubTronic control box/panel



Figure 10 How to connect the infra-red port



Figure 11 Blac Bocs infra-red port position



Figure 12 Blac Bocs infra-red cable and connector

7.2 SMARTA Logger for DOL Starters

- See Figure 17 (Smarta Logger & Reader) for the appropriate wiring diagramme.
- Connect the SMARTA logger power supply to 230Vac.
- Do not lengthen the control wires supplied. External electrical noise can influence operation and cause spurious switching.
- Other control switches such as level and/or pressure control should be wired in series with the SMARTA Logger control wiring.
- Check the wiring connecting the Reader and the SMARTA logger. There are 4 sets of wiring to be checked.
- See Figure 13 to Figure 16 for a typical installation example. The electrical wiring diagramme is shown in Figure 17. Note that the DOL starter contactor coil contacts, when wired as indicated, retains the overload protection.



WARNING – The SMARTA Reader does not provide any protection. If required, use other means of protection such as SubTronic or Blac Bocs or similar.

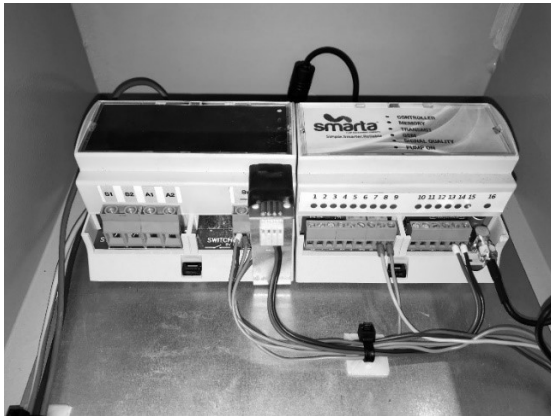


Figure 13 SMARTA Logger and Reader close-up



Figure 14 SMARTA Logger and Reader components



Figure 15 SMARTA Logger and Reader enclosure mounted

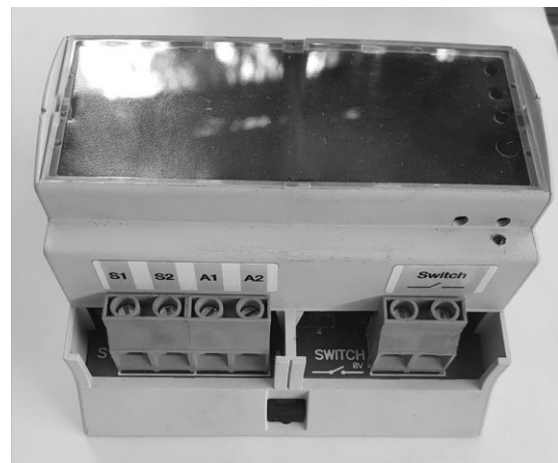


Figure 16 SMARTA Reader close-up

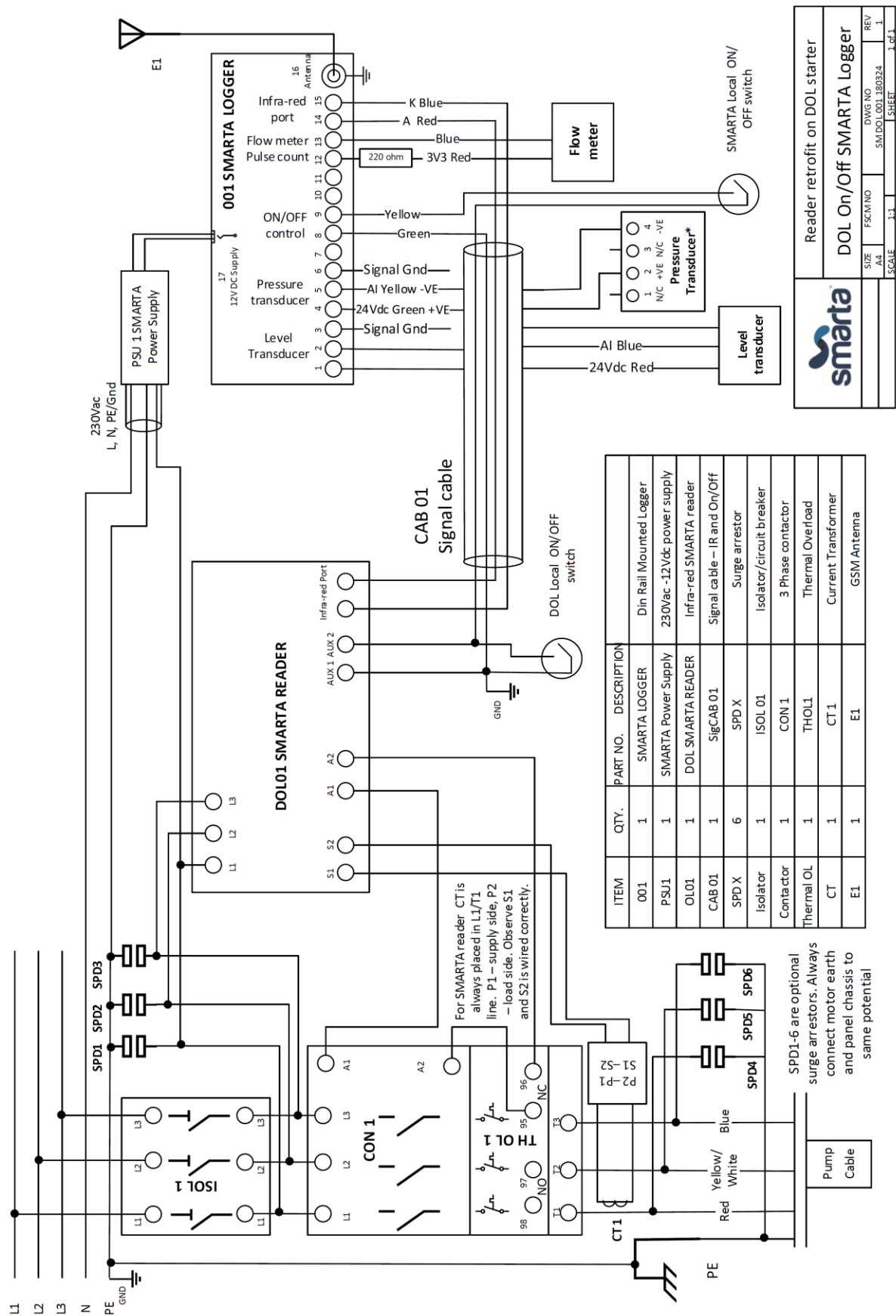


Figure 17 Electrical wiring diagramme - SMARTA Reader & Logger for DOL starter

7.3 SMARTA Logger for Generic motor controllers

- Note – the SMARTA Generic Reader has been discontinued. The Generic Reader can be identified by the absence of A1 and A2 contactor terminals.
- See Figure 20 (Smarta Logger & Generic Reader) for the appropriate wiring diagramme.
- Connect the SMARTA logger power supply to 230Vac.
- Connect the yellow and green wires of the supplied multi core cable in parallel to the pump control box auxiliary or switch ON/OFF input terminals. The SMARTA Logger control (remote switching function) should be connected in parallel to the existing control box ON/OFF switch. The SMARTA logger is supplied with a local ON/OFF switch to disable remote operation if required.
- Do not lengthen the control wires supplied. External electrical noise can influence operation and cause spurious switching.
- Other control switches such as level and/or pressure control should be wired in series with the SMARTA Logger control wiring.
- Check the wiring connecting the Reader and the SMARTA logger. There are 4 sets of wiring to be checked.
- See Figure 18 to Figure 19 for a typical installation example. The electrical wiring diagramme is shown in Figure 20. Note that the generic controller, when wired as indicated, retains all protection and is controlled (ON/OFF) directly from the SMARTA Logger.



WARNING – The SMARTA Reader does not provide any protection. All protection is/should be provided by the generic controller. If additional or other means of protection is required, use protection such as SubTronic or Blac Bocs or similar in place of the generic controller.



Figure 18 SMARTA and generic Reader - discontinued



Figure 19 SMARTA and Generic Reader - discontinued

The complete SMARTA Logger and motor control panel is designed to ease the installation of motor control panels where remote management and monitoring is required. It is designed for new installations and serves a dual purpose of providing motor management and remote control and logging capabilities.

The wiring diagramme is shown in Figure 21

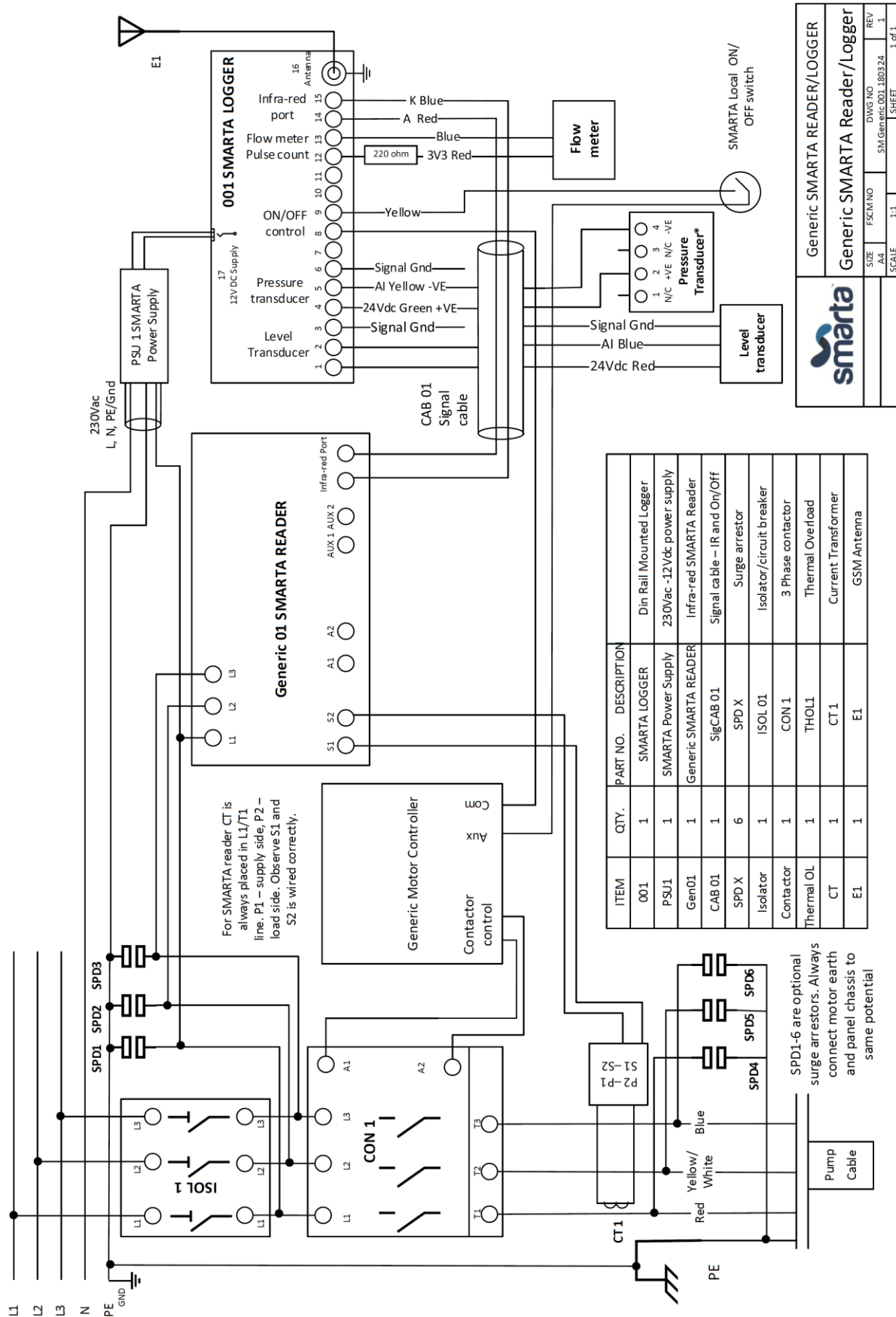
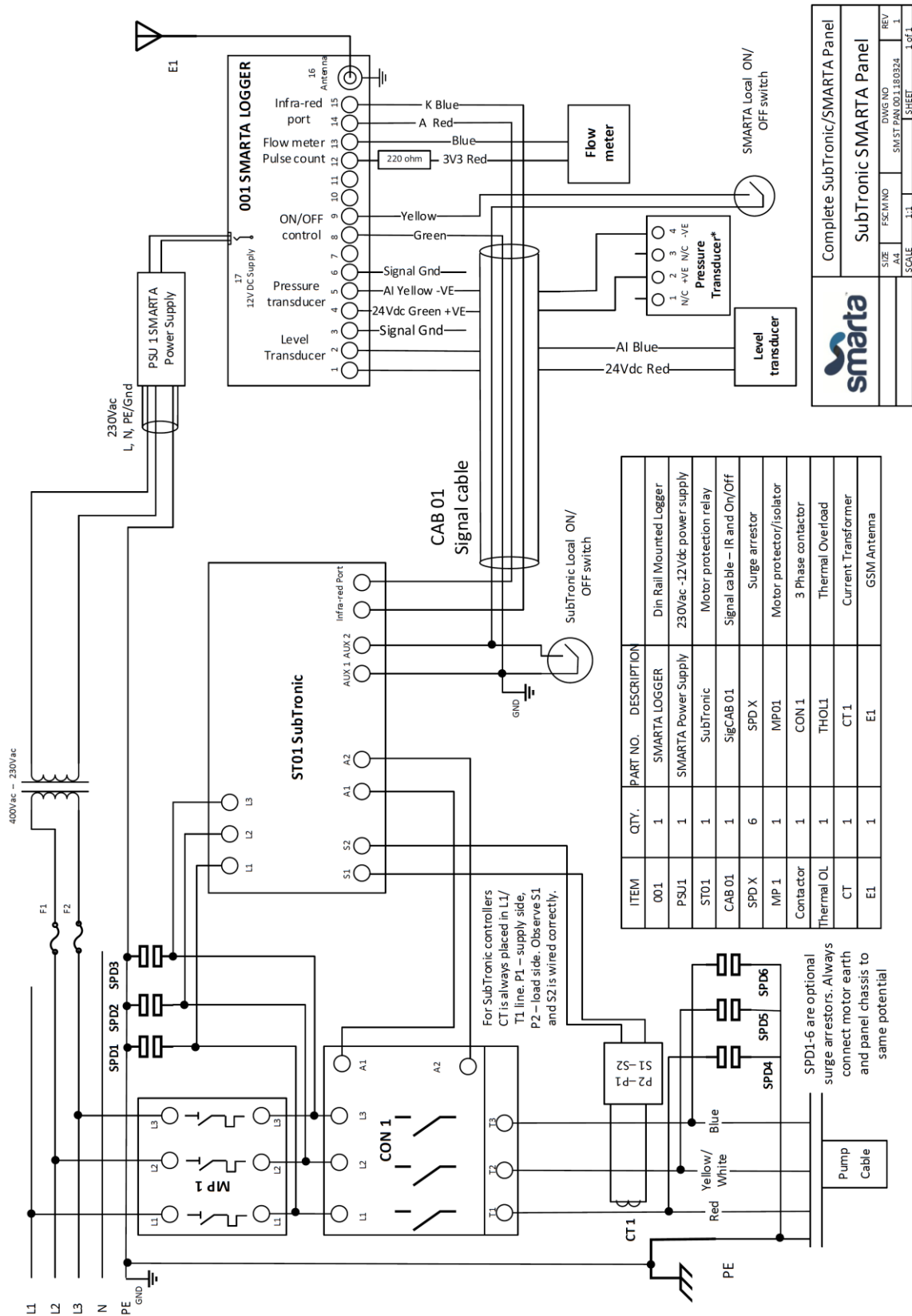


Figure 20 Electrical wiring diagramme - SMARTA Reader & Logger for generic motor controller



Complete SubTronic/SMARTA Panel			
SubTronic SMARTA Panel			
SIZE	ASC	FSM/NO	DWG NO
A4	1:1	SM ST PAN 001.180324	REV 1
SHEET	1 of 1		

Figure 21 Complete SMARTA Logger and motor control panel

8 Installing field instruments

8.1 Water Flow Meter

8.1.1 Introduction

For water flow meters to operate correctly the flow upstream and downstream of the flow-meter must be as free as possible from obstructions, such as butter-fly valves, flow switches, elbows etc, as they can cause incorrect measurement of flow and induce errors ranging $\pm 50\%$. The flow of water into flow-meters can also be disturbed by partially open valves or poorly mounted flange gaskets. The preferred installed location of meters is above ground.

8.1.2 Pipe lengths

Laminar flow is required to ensure accurate water flow measurement. Water meter accuracy is affected by excessive water turbulence. The greater the turbulent flow the greater the measurement error. To reduce turbulence, ensure that there is a length of pipe, that is at least 10 times its diameter, free of any bends or fittings BEFORE the meter being installed and at least 5 times its diameter AFTER the meter being installed.

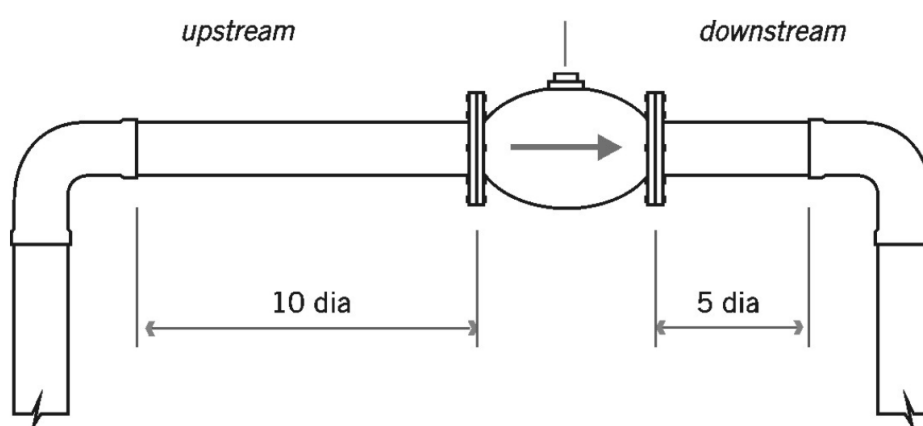


Figure 22 Standard flow meter pipe run.

In circumstances where it is impractical to install a meter with the same diameter of pipe work, reducers with concentric tapers may be used. However, this is conditional on the use of a 6 to 1 ratio taper followed by a minimum length of 10 diameters of straight rigid pipe fitted on the intake side of the meter and a minimum of 5 diameters of straight rigid pipe on the discharge of the meter, followed by a 6 to 1 ratio taper back out to the existing pipe work to minimize flow disturbance.

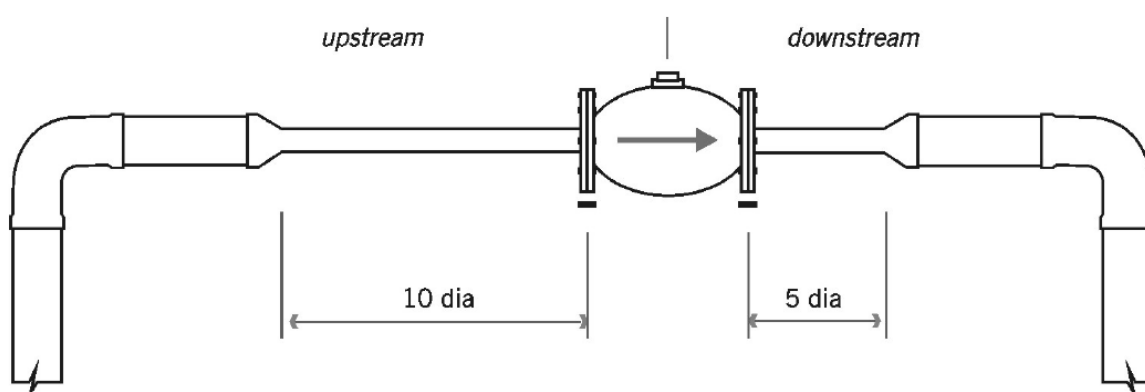


Figure 23 Reduced diameter pipe run.

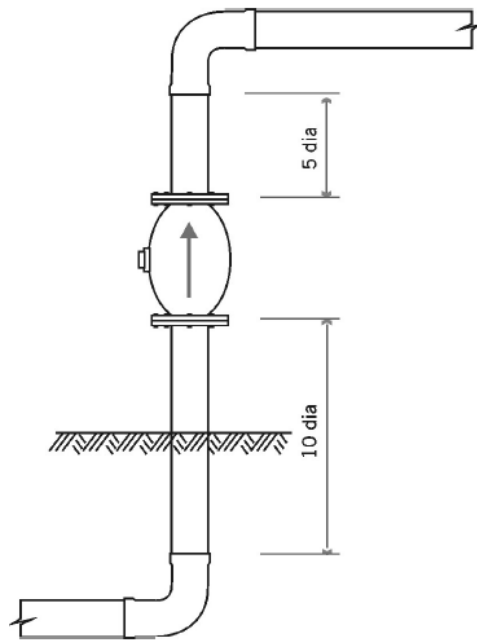


Figure 24 Vertical pipe run.

8.1.3 Location of meter

Meters are to be located as close as practical to the point of extraction and preferably on the discharge side of the pump. Do not locate flow meter more than 10m away from the SMARTA Logger. There must only be permitted off-takes of water between the point of extraction and the meter. These flows will not be registered on the meter. The measuring mechanism of the meter must be in a straight clean pipe of uniform, circular cross section and without any fittings or obstructions.

Important. In all cases the meter must be installed so that *at all flow rates* there is a “full pipe of water” on both the intake and discharge sides of the meter. Meters located down to 0.5 meters below ground will require a suitable meter box to house the meter. The meter must not be installed in a section of pipe where there may be air pockets, preventing the pipe from running full of water. If it is likely that air will become entrapped near the meter, an air valve must be installed upstream of the meter. A meter designed for operation in full flowing pipes shall be installed so that it is filled with water under all conditions during operation. Non-pressurised systems may require elbows or pipe elevation to ensure that this requirement is met.

8.1.4 Installation and connection to SMARTA detail

Any filtering equipment must be installed on the intake side of the meter at least 10 pipe diameters upstream. Any non-return valve must be installed on the discharge side of the meter at least 5 pipe diameters downstream of the flow meter. The meter must be installed in the correct direction to flow.

Install the meter in a HORIZONTAL plane, with the register UPRIGHT, in a location accessible for reading, service and inspection. Do NOT OVER tighten connections; tighten only as required to seal. Insert reed switch and turn 1/4 turn to lock in place. Tie black and red wires on opposite end of reed switch to corresponding black and red water meter wires on controller. INSULATE connection with water-proof wrapping tape. Check the pulse rate or setting of the meter. Set the correct litre count per pulse on the SMARTA website by accessing the “Settings” and adjust the “Litres per pulse” setting. Enter the value in the “Update Settings” box. Ensure that the “Enabled?” box is checked. Click “Update Analog Settings” block to update new setting. See Figure 25.

Pump Curve	Current Settings Update Settings	
Export data	Logger SN 3D373949	
Settings	Pump Name Smarta Office	
Users	Motor Size 0.56kW	
Reports	Subtronic model 1 phase Calib. 0.25-1.1kW	
Electricity Pricing	CT Primary (eg. 75) 1	
SMS Commands	CT Secondary (eg. 5) 1	
Error Logs	Division Ratio 4	
	Pump depth (m) 1.00	

Analog Input Settings		Update Analog Settings
Analog inputs setup (20mA equivalent to)		Update Settings
Max cal. water level (m)	1.00	☒
Depth of water level probe (m)	1.00	
Max cal. pump pressure probe (m)	40.00	☒
Litre per pulse (l)	100	☒

Figure 25 Set "Analog Input Settings" on SMARTA website

8.2 Level transducer installation

8.2.1 Installation of the level transducer

The SMARTA logger makes use of isolated power supplies. Leakage currents through the isolated circuit must be considered. Systems utilizing isolated power supplies are susceptible to measurement errors when isolation protection circuits are compromised by transient surges. Surge protection on sensor lines is recommended in this case. Contact your supplier.

Prior to installation, it is recommended that a pre-installation test be conducted. Identify the positive and negative lead of the transducer. Lead colours may vary. The polarity overrides colour. Check the supplier's manual. See Figure 26.

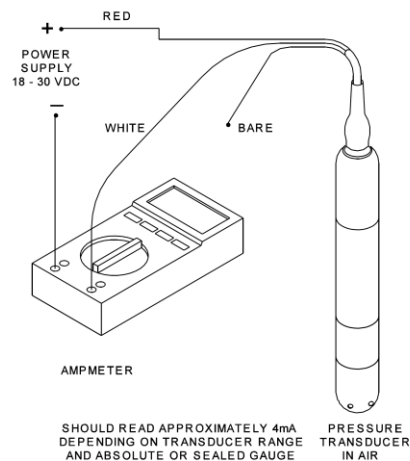


Figure 26 Pressure transducer pre-installation test (Geotech)

The installation of a dip tube or piezometer tube is recommended. The tube is a small diameter (typically 32mm class 3 HDPE) pipe that goes down into the borehole. The water level can now be measured by lowering the level transducer into the piezometer tube. The dip tube can also be used with a dip meter to determine the water level. When not being used, the top of the piezometer tube should be closed with an end cap. See Figure 27.

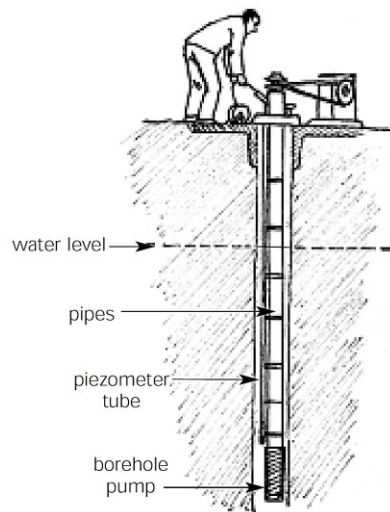


Figure 27 Dip-tube (piezometer tube) installation (DWA)

8.2.2 Vented gauge sensor application description (SMARTA supplied)

Vented Gauge Sensors are well suited for all pressure range measurements. However, cable length and vent line maintenance become problematic at 150m H₂O. For this reason, it is recommended the vented gauge sensor be employed in applications requiring less than 140m H₂O nominal or less than 150m of vented tubing cable. When installing a pumping system and transducer with vented cable down well, the cable should be secured to the discharge pipe at 3m to 9m increments. In deep well applications of over 30m, vertical auxiliary strain relief cable may be required. Desiccant replacement frequency is site dependent. Regional humidity levels and cable length will determine desiccant replacement frequency. Higher humidity and longer cable lengths will require more frequent desiccant replacement. Damp wellhead vaults can also increase desiccant replacement frequency. The vent tube can also be protected by a filter plug.

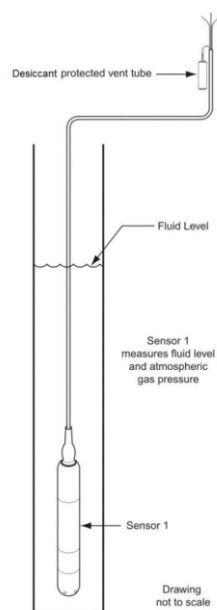


Figure 28 Vented pressure transducer installation

8.2.3 Sealed level transducers (Contact SMARTA if required)

Sealed level transducers are best suited for applications measuring 140m H₂O and higher. Sealed Gauge Sensors do not compensate for changes in local atmospheric pressure. They are calibrated to a nominal atmospheric pressure at sea level or 10.2m H₂O. In applications requiring less than 140m H₂O a local barometric pressure sensor (absolute pressure sensor) will be required to correct for variations. Variation may be up to ± 0.2 m H₂O, causing measurement error. Do not attempt to measure water level variation of less than ± 1 m H₂O with an absolute (sealed) transducer.

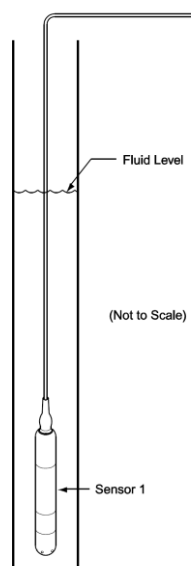


Figure 29 Absolute level transducer installation

8.2.4 Activating the level transducer on the SMARTA website

Ensure that the “Enabled?” box next to the “Max cal. Water level (m)” is checked. Note the calibrated maximum pressure of the level transducer on the level transducer. Set the maximum calibrated water level on the SMARTA website by accessing the “Settings” and adjust the “Max cal. water level (m)” setting. Enter the value in the “Update Settings” box. Click “Update Analog Settings” block to update the new setting. See Figure 25.

Note the installation depth of the level transducer. Set the depth of the water level probe on the SMARTA website by accessing the “Settings” and adjust the “Depth of water level probe (m)” setting. Enter the value in the “Update Settings” box. Click “Update Analog Settings” block to update the new setting. See Figure 25.

8.3 Pressure transducer installation

Install the pressure transducer according to the supplied instructions. Note the pressure range (maximum) of the transducer. Ensure that the “Enabled?” box next to the “Max cal. pump pressure probe (m)” is checked. Note the calibrated maximum pressure of the pressure transducer (printed on the pressure transducer). Set the maximum calibrated pressure of the transducer on the SMARTA website by accessing the “Settings” and adjust the “Max cal. Pump pressure probe (m)” setting. Enter the value in the “Update Settings” box. Click “Update Analog Settings” block to update the new setting. See Figure 25.

9 Starting up the SMARTA Logger

Place the antenna in such a position that the signal reception is acceptable. Signal quality can be checked after switching on.

SMARTA loggers are supplied with an ILA — Information Level Agreement contract — which include the SIM card.

Switch on power to the control box and SMARTA logger.

10 SMARTA Logger status lights

Note the light indicators on the SMARTA Logger.



Figure 30 SMARTA Logger status indication

CONTROLLER (SubTronic/Blac Bocs/Reader) — Light blinks whenever the logger receives valid data from the SubTronic, Blac Bocs or SMARTA Reader. The light will blink about once a second if the logger is connected to the SubTronic correctly.

MEMORY — Light will go on if there is any data in the memory.

TRANSMIT — Light goes on while the SMARTA logger is busy uploading data. Once the data has been transmitted the TRANSMIT and MEMORY lights will go off. If the transmission was unsuccessful, the MEMORY light will remain on and a further attempt will be made to transmit the data.

GSM (Modem) — This is the status light of the internal modem:

Off — Modem is not working

Flashes once per second — Modem does not find the network.

Flashes once every three seconds — Modem is registered to the network

Flashes once every half second — GPRS communication.

SIGNAL QUALITY — Higher rate of blinking represents better signal quality.

11 Load Telegram on your smart device (mobile phone, laptop, PC etc)

Telegram allows access to your SMARTA Logger and logging system, allowing you to receive Alarm notifications and information. You must have Telegram installed to activate this service. Follow the instructions appropriate to your application. For smart devices use Playstore (Android) and App Store (Apple) to install Telegram on your smart device (phone or tablet).

Telegram Messenger

<https://telegram.org/> ▼

Feb 6. Streaming and Auto-Night Mode on Android · Feb 6. Telegram Login for Websites · Jan 31. Telegram X: Progress through Competition · Telegram logo. a new era of messaging. Telegram for Android Telegram for iPhone / iPad Telegram for WP Telegram for Windows / Mac / Linux Browse more Telegram apps ...

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Telegram Desktop

<https://desktop.telegram.org/> ▼

Fast and secure desktop app, perfectly synced with your mobile phone. Get Telegram for Windows Portable version for Windows Get Telegram for macOS Mac App Store version · Get Telegram for Linux 64 bit Get Telegram for Linux 32 bit. Show all platforms. Official app for macOS from Telegram team. This software is ...

Telegram Messenger on the App Store - iTunes - Apple

<https://itunes.apple.com/us/app/telegram-messenger/id686449807?mt=8> ▼

★★★★★ Rating: 4,3 - 17,652 reviews - Free - iOS - Social Networking

Read reviews, compare customer ratings, see screenshots, and learn more about Telegram Messenger. Download Telegram Messenger and enjoy it on your iPhone, iPad, and iPod touch.

Telegram

Software



Telegram is a non-profit cloud-based instant messaging service. Telegram client apps are available for Android, iOS, Windows Phone, Windows NT, macOS and Linux. [Wikipedia](#)

Initial release date: 14 August 2013

MacOS (Mac App Store version): 3.7.5 (115423) / 21 January 2018; 34 days ago

iOS, original: 4.7.1 (68086) / 4 January 2018; 51 days ago

Android, Telegram X: 0.20.5.846 / 14 February 2018; 10 days ago

Programming language: C++

Platforms: [Android](#), [iOS](#), [Windows Phone](#), [Windows NT](#), [macOS](#), [Linux](#), [Web application](#)

Figure 31 Install Telegram

Once installed:

1. Go to “Search” and send any message to @userinfobot to get your “User ID”
2. Fill in the “User ID” on the SMARTA Alarm page, once logged on.

Overview
Scheduler
Alarms
View data
Pump Curve

Receive Alarms when the logger detects events

SMS Alerts	Email Alerts	Telegram Alerts
☐ +27764323013	☐ -	☐ 370110173
☐ +27820770717	☐ -	☐ -
☐ -	☐ -	☐ -
Add	Add	Add

SMS Alarms not available under Copper Subscription

Figure 32 Set up Alarms

3. Send any message to the SMARTA Telegram bot: @smartaonlinebot

You are now ready to receive Alarms and notifications.

12 Confirm/set up your account on the SMARTA Logger website

Your SMARTA Logger and logging system is preloaded with the necessary account detail at the time of order. Log onto www.smartaonline.com. Enter your email address used for the registration and password provided.

The setup of an account with the SMARTA is important to allow communication with the online data server so that data can be uploaded and saved. If your account has not been set up this can be done by either the authorised SMARTA dealer, SMARTA, the installer or yourself.

Make sure that a registered a SIM card is installed in the SMARTA logger to register an account online. This procedure can be completed without being connected to a controller and can therefore be done before going to site.

Go to the SMARTA server website: www.smartaonline.com



PUMP MANAGEMENT CONCEPTS

Simple.Smartier.Reliable

[Lost your password?](#)

Figure 33 Logging into your SMARTA website

Complete the following actions on the SMARTA Pump Management Systems landing page:

- Create an account
- Login (if you have an account)
- Login to the Demo account

To create an account, click on the “Create Account” tab. Your Login details will be required. Enter your Email address and Password. Complete the account details. Click on the “Register” button. Once registered you will be able to log in.

If you received the SMARTA Logger and logging system already preloaded with “Account information”, confirm that the details are correct.

You are ready to set up your SMARTA Logger and logging system.



Create a new account	
Logger Serial Number Name your pump Motor control unit	Personal Information Name Surname Phone number Company Country I agree to Terms and conditions?
Account Information Email address Confirm email address Password Confirm password	Register

Figure 34 Create a new SMARTA account

13 Setting up the website for a SMARTA Logger



This setup procedure assumes that the pump/motor control system is set up correctly and that all protection features are in place. SMARTA Logger and Logging System does not provide pump and motor protection outside of the existing management and control system. Contact your SMARTA dealer for advice on the installation of pump and motor management and protection systems.

Follow the procedure in the previous paragraph — it is preferable to receive the SMARTA Logger with pre-installed “Account Information”, ensuring correct online registration. If not ordered with “Account information” setup, set up the SMARTA Logger “Account information” before installation, however there is no limitation to doing it on site.

13.1 Confirm SMARTA Logger status

If necessary install the SubTronic Logger first and ensure correct operation — follow the SubTronic manual. Once SMARTA is installed at site — see installation procedures in previous paragraphs — observe the light indicators:

- Power up the pump controller (SubTronic, Blac Bocs, Generic controller, DOL) and the SMARTA Logger. Check that the **CONTROLLER** Light is blinking about once per second as this shows that it is receiving data from the pump controller correctly
- Check that **SIGNAL QUALITY** light is flashing reasonably fast to indicate good signal strength
- Check that the **GSM** light flashes fast – 3 times per second.
- Check that the **TRANSMIT** blinks and **MEMORY** light goes off, indicating that data is being uploaded every 5 minutes.
- Visit the website to confirm when it last contacted the website. In the example (see Figure 35) the following information explains the connection status of the SMARTA Logger:
 - The pump is off
 - The SMARTA Logger is connected to the website
 - The information was last updated 2018/03/04 at 16:22
 - The signal strength is good (3 of 4 bars)

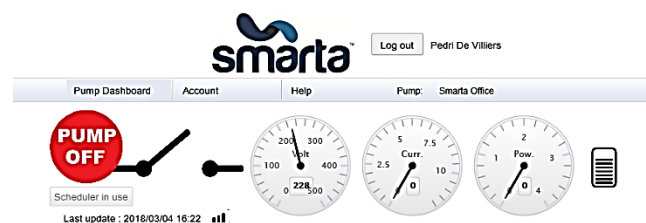


Figure 35 SMARTA connected to website

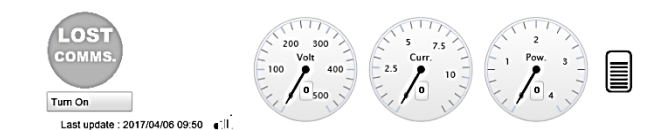


Figure 36 SMARTA communications lost

- See Figure 36. This is a typical example of a SMARTA Logger that lost communication and is not connected to the website.

13.2 General Pump Settings

Under the “**Settings**” tab the “**General Pump Setting**” block is used to set up motor data (see Figure 37):

- Confirmed the SubTronic or Blac Bocs model connected in the **Settings** tab. If the incorrect SubTronic or Blac Bocs model is chosen, the power, current and voltage figures will be wrong. Once the model is changed, it will only correct the values for future data.
- For Generic controllers and DOL systems, select the correct motor size under “**Motor Size**” and “**SubTronic Calibratable model**”
- Click “**Update General**” for any changes to take effect.

Figure 37 Settings: General Pump Settings

13.3 Field Instrumentation Settings – Analog Input Settings

Under the “**Settings**” tab the “**Analog Input Settings**” block is used to set up field instruments’ data. Check the “**Enabled?**” box if you have access to changing settings. Make the necessary changes and click “**Update Analog Settings**” (see Figure 38):

- If a level meter is connected, the maximum value (full scale) correlating to 20mA must be input in the settings page.
- If a flow meter is connected, the pulse rate in litres per pulse must be input in the settings page.
- If a pressure transducer is connected, the maximum value (full scale) correlating to 20mA must be input in the settings page.
- Test the pump control function by switching the pump ON and OFF. (This can take up to 1 minute to change)

Figure 38 Settings: Analog Input Settings

IMPORTANT The time on the logger is retrieved from the telecommunication network once per day. If the time on the server is wrong, it will correct itself within 24 hours.

13.4 Pump Performance Settings

Note – to utilise this function a flow meter, level transducer and pressure transducer at the borehole outlet must be installed.

Under the “**Settings**” tab the “**Pump Performance Curve**” data can be entered (Figure 39).

Select points from a typical curve as shown in Figure 40.

These points are then entered in the “**Pump Performance Curve**” block under “**Settings**”. The Pump curve data can be used to confirm that the duty point

Figure 39 Pump Performance Curve

of the pump is on the pump curve and more specifically that the middle third of the pump curve is being used and that there is no pump wear present.

Space the 6 selected points as evenly as possible over the complete pump curve. Ensure that the correct units are used. Convert the pump curve units to litres/minute for the flow and meters for the head if necessary. Pump curves are obtained from your pump supplier.

Table 1 Selected pump performance points from pump curve below

Point	Flow rate (l/min)	Head (m)
1	0	45
2	20	42
3	40	38
4	60	32
5	80	24
6	100	10

The selected points in Table 1 are read from a typical pump curve as shown in Figure 40.

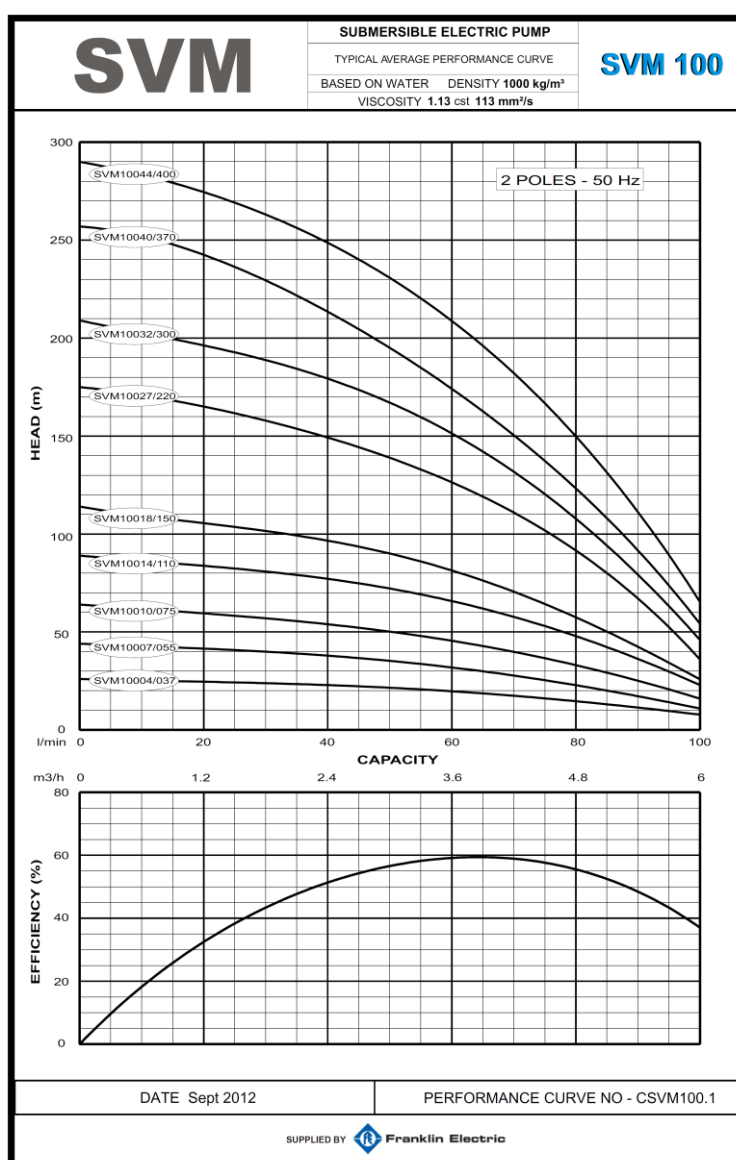


Figure 40 Typical pump curve

Once all settings have been done, SMARTA is ready to log and manage your pump. SMARTA is designed to make your pumping system accessible and manageable in ways not possible previously. The basket of tools includes:

- Overview – status of your pump/site at a glance
- Scheduler – set automatic operating patterns (ON/OFF cycles) for your pump on an hourly basis for 7 days of the week
- Alarms – set alarms via Telegram, SMS or email to warn you of conditions preprogrammed
- View data – view a complete suite of data options, giving you immediate information regarding your pump and pumping system
- Pump curve – duty points are plotted daily and weekly to indicate any abnormal behaviour
- Export data – data can be exported for use in analysis, advanced reporting, history storage or comparison purposes
- Settings – you can set up your website according to your needs and installation
- Users – you can set up a user/s profile

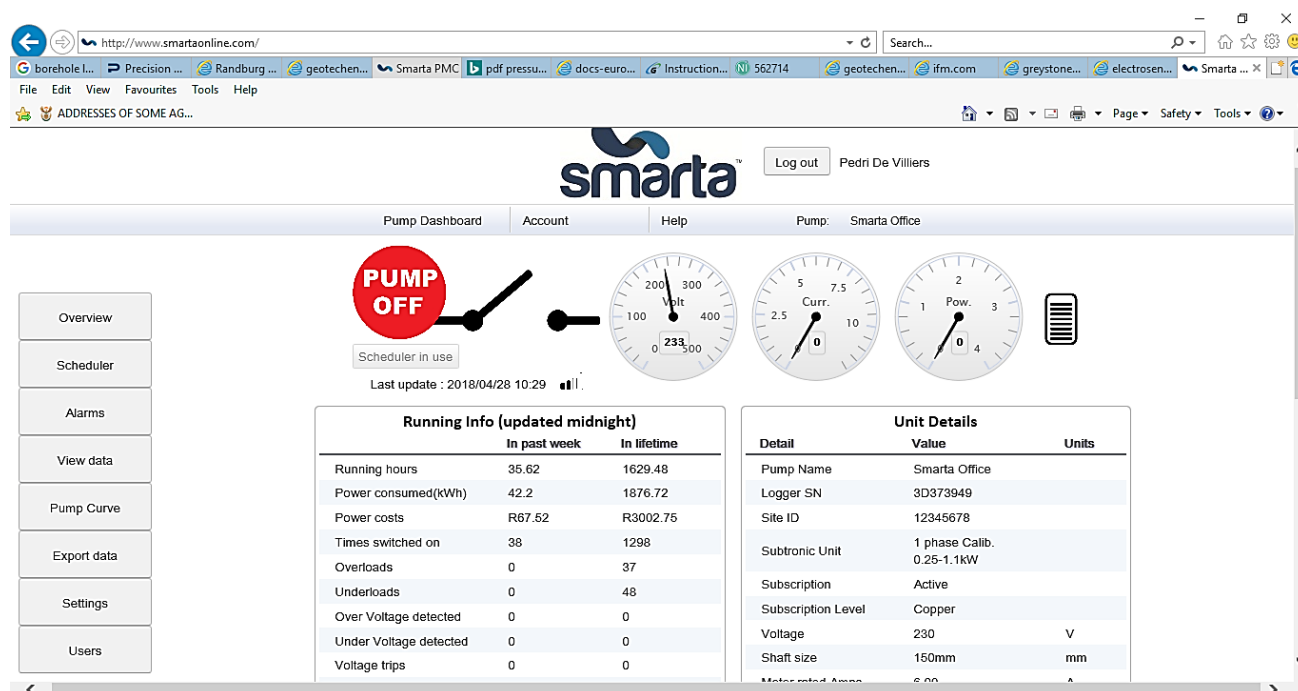


Figure 41 SMARTA basket of tools

14 Operating and using the SMARTA website

14.1 Logging into the SMARTA website

Log into the SMARTA website –

www.smartaonline.com

The landing page is displayed. Enter your email address and password to Login. Other actions include:

Recover your password with the “Lost your password?” service.

Login to the SMARTA Demo Account.

Create a new account



Figure 42 SMARTA Logger landing page

14.2 Pump Dashboard

On logging in, the “Pump Dashboard” is displayed, showing all the sites/units registered to the user name. A list of all pumps/sites and alarms are displayed. Sites that are active, lost communications or deactivated subscriptions can be seen. Active sites are online and can be accessed, controlled and data viewed. Lost Communication sites indicate a break in communication with the site. It may be temporarily or may require assistance. Power may be down or there may be signal problems. Deactivated sites are sites where the SMARTA subscription lapsed.

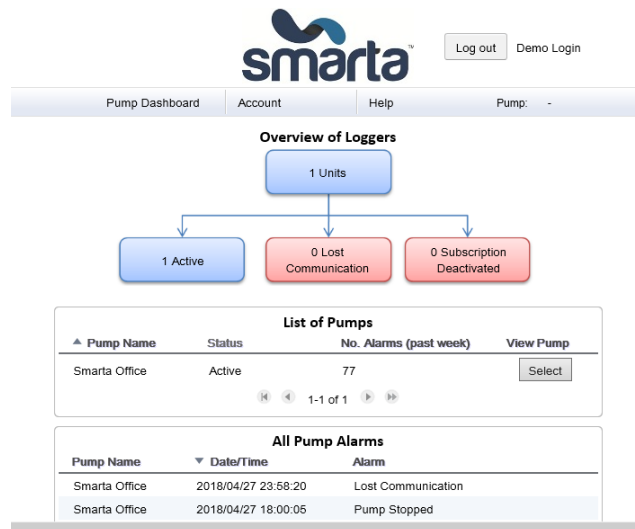


Figure 43 Pump Dashboard

14.3 Select a site/pump

Highlight a site/pump that you want to access. Click on the “Select” button to select the specific site. The active “Select” button will turn blue. This action will open the “Overview” page.

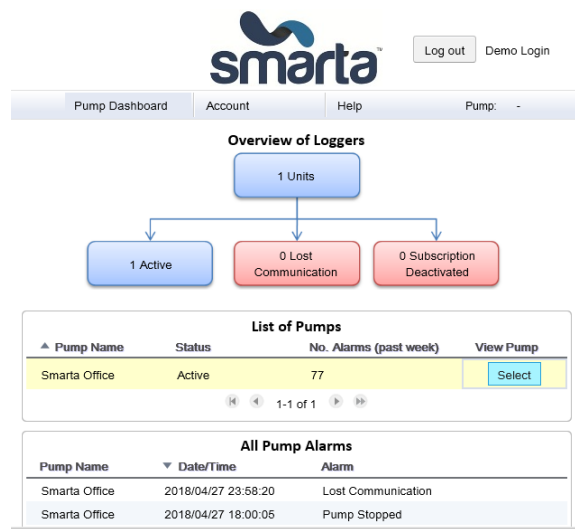


Figure 44 Select a pump/site

14.4 Overview page

The Overview page shows whether the pump is on or off, why it is on or off, what the status of the electric motor and supply is, what the signal strength is, when the data was last updated, Running Information, Unit Details and Alarm List.

Other options can be accessed from the Overview page.

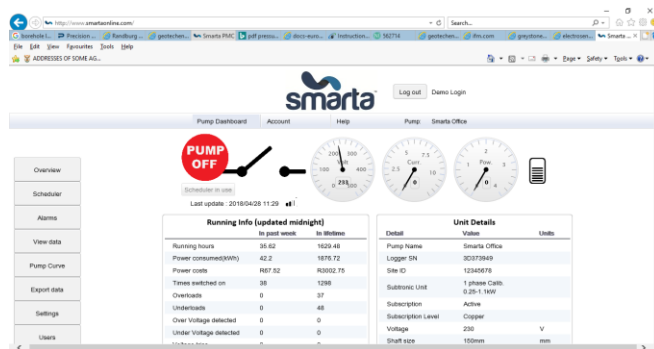


Figure 45 Overview page

14.4.1 Pump Status

Pump ON/OFF – indicates whether pump is running or not

Scheduler in use – indicates whether Scheduler is active or not

Last update – check to see when last the website data was updated.

Signal strength bar  – indicates signal strength

Refresh meter  - indicates that the screen is being refreshed. The refresh rate is 5 minutes

Messaging – the red bar indicates extraordinary conditions that prevail.

Turn Off/ Turn On button – the pump can be controlled directly from the Pump Status screen.

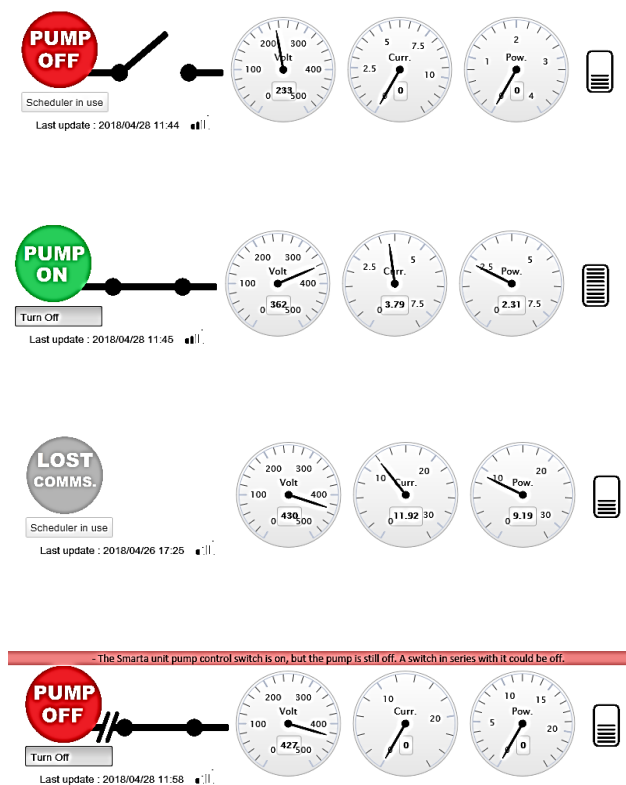


Figure 46 Pump status

14.4.2 Running info

The Running info includes:

Running hours

Consumed power and cost thereof

Type and number of trip events – refer to the SubTronic or Blac Bocs manual.

Running Info (updated midnight)		
	In past week	In lifetime
Running hours	35.62	1629.48
Power consumed(kWh)	42.2	1876.72
Power costs	R67.52	R3002.75
Times switched on	38	1298
Overloads	0	37
Underloads	0	48
Over Voltage detected	0	0
Under Voltage detected	0	0
Voltage trips	0	0
Unauthorised starts	0	0
Times calibrated	0	11
Times locked out	0	0

Figure 47 Overview - Running Info (updated midnight)

14.4.3 Unit Details

The site, subscription, motor, controller and installation details are shown in the Unit Details window.

Unit Details		
Detail	Value	Units
Pump Name	Smarta Office	
Logger SN	3D373949	
Site ID	12345678	
Subtronic Unit	1 phase Calib. 0.25-1.1kW	
Subscription	Active	
Subscription Level	Copper	
Voltage	230	V
Shaft size	150mm	mm
Motor rated Amps	6.00	A
Motor Size	0.56	kW
CT Ratio Primary	1	
CT Ratio Secondary	1	
Account Activated	2015/05/27	

Figure 48 Unit Details

14.4.4 Alarm List

The Alarm List show all condition changes that took place with the latest at the top of the list. All selected alarm conditions that occur are shown. See §14.6.

Alarm List	
▼ Date and Time	Alarm
2018/04/27 23:58:20	Lost Communication
2018/04/27 18:00:05	Pump Stopped
2018/04/27 17:00:09	Pump Start
2018/04/27 16:00:05	Pump Stopped
2018/04/27 15:00:09	Pump Start
2018/04/27 14:00:05	Pump Stopped
2018/04/27 13:00:09	Pump Start
2018/04/27 12:00:01	Pump Stopped
2018/04/27 11:00:08	Pump Start
2018/04/27 10:00:05	Pump Stopped
2018/04/27 09:00:08	Pump Start
2018/04/27 08:00:05	Pump Stopped
2018/04/27 07:00:07	Pump Start
2018/04/26 23:57:41	Pump Stopped
2018/04/26 23:00:08	Pump Start
1-15 of 157	

Figure 49 Alarm List

14.4.5 Data and Control options

The available website option can be accessed from the navigation buttons on the left of the screen.

Overview
Scheduler
Alarms
View data
Pump Curve
Export data
Settings
Users

Figure 50 Data and Control options from Overview page

14.5 Scheduler

The Scheduler is set up and configured in this window.

Check the “Enable Scheduler” box

Tick the appropriate boxes to activate the pump for all days of the week as required.

Click the “Update Scheduler” box.

Refer to §14.4.1 – check that the Scheduler is now active.

Time	Mon	Tue	Wed	Thu	Fri	Sat	Sun
0:00	☐	☐	☒	☐	☐	☐	☐
1:00	☐	☒	☐	☐	☐	☐	☐
2:00	☐	☐	☐	☐	☐	☐	☐
3:00	☐	☐	☐	☐	☐	☐	☐
4:00	☐	☐	☐	☐	☐	☐	☐
5:00	☐	☐	☐	☐	☐	☐	☐
6:00	☐	☐	☐	☐	☐	☐	☐
7:00	☒	☒	☒	☒	☒	☐	☐
8:00	☐	☐	☐	☐	☐	☐	☐
9:00	☒	☒	☒	☒	☒	☐	☐
10:00	☐	☐	☐	☐	☐	☐	☐
11:00	☒	☒	☒	☒	☒	☐	☐
12:00	☐	☐	☐	☐	☐	☐	☐
13:00	☒	☒	☒	☒	☒	☐	☐
14:00	☐	☐	☐	☐	☐	☐	☐
15:00	☒	☒	☒	☒	☒	☐	☐
16:00	☐	☐	☐	☐	☐	☐	☐
17:00	☒	☒	☒	☒	☒	☐	☐
18:00	☐	☐	☐	☐	☐	☐	☐
19:00	☐	☒	☐	☐	☐	☐	☐
20:00	☐	☐	☐	☐	☐	☐	☐
21:00	☐	☐	☐	☐	☐	☐	☐
22:00	☐	☐	☐	☐	☐	☐	☐
23:00	☒	☐	☐	☒	☐	☐	☐

Update Schedule ☒ Enable Scheduler

Figure 51 Scheduler set-up

14.6 Alarms set-up

The Alarm messaging system is activated and selected in this window.

Edit the list of all recipients of SMS, email and Telegram alerts by adding/deleting each individually.

Set up means of messaging by checking the appropriate check box next to each condition.

Click the “Update alarm selection” button.

Receive Alarms when the logger detects events

SMS Alerts	Email Alerts	Telegram Alerts
☒ +27764323013	☒ -	☒ 370110173
☒ +27820770717	☒ -	☒ -
☒ -	☒ -	☒ -
Add	Add	Add

SMS Alarms not available under Copper Subscription

SMS	Email	Telegram	Alarm
☒	☒	☒	Pump start
☒	☒	☒	Pump stop
☒	☒	☒	Voltage and current deviations
☒	☒	☒	Voltage and current trips
☒	☒	☒	Unauthorised run
☒	☒	☒	Unit locked out
☒	☒	☒	Subtronic calibration
☒	☒	☒	Lost GSM communication
☒	☒	☒	Intrusion alert

Update alarm selection

Figure 52 Alarms set-up

14.7 View data

The pump operation and condition can be viewed in table for in the Details Table mode.

Select the date range and click the “Update table” button to refresh the Details table.

Details table	Overview graph	Details graph	Flow & level graph	Water level graph	Trips counter graph	Technical graph
---------------	----------------	---------------	--------------------	-------------------	---------------------	-----------------

From: 2018 Apr 27 13:02:32 To: 2018 Apr 28 13:02:32 Update Table

▼ Date and Time	Current (A)	Voltage (V)	Power (kW)	Mode	Water Level (m)	Pressure (m)	Flow (l/min)	On/Off Relay	Signal (%)
2018/04/28 13:00:25	0.00	233	0.00	Standby	0.55	0.01	0.00	0	53
2018/04/28 12:55:32	0.00	233	0.00	Standby	0.55	0.01	0.00	0	56
2018/04/28 12:50:30	0.00	233	0.00	Standby	0.55	-0.12	0.00	0	53
2018/04/28 12:45:27	0.00	233	0.00	Standby	0.55	-0.03	0.00	0	53
2018/04/28 12:40:24	0.00	233	0.00	Standby	0.55	0.06	0.00	0	53
2018/04/28 12:35:20	0.00	233	0.00	Standby	0.55	-0.03	0.00	0	53
2018/04/28 12:30:17	0.00	233	0.00	Standby	0.55	-0.03	0.00	0	50
2018/04/28 12:25:14	0.00	233	0.00	Standby	0.55	0.01	0.00	0	53
2018/04/28 12:20:11	0.00	233	0.00	Standby	0.55	0.01	0.00	0	53
2018/04/28 12:15:09	0.00	233	0.00	Standby	0.55	0.06	0.00	0	53
2018/04/28 12:10:06	0.00	233	0.00	Standby	0.56	0.06	0.00	0	53
2018/04/28 12:05:03	0.00	233	0.00	Standby	0.55	0.06	0.00	0	53
2018/04/28 11:59:59	0.00	233	0.00	Standby	0.55	0.01	0.00	0	56
2018/04/28 11:54:57	0.00	233	0.00	Standby	0.55	-0.08	0.00	0	53
2018/04/28 11:49:54	0.00	233	0.00	Standby	0.56	0.06	0.00	0	53

1-15 of 249

Figure 53 View Data – Details table

14.7.1 Viewing graphs

– Select dates

The graphs can be viewed by selecting a start and a stop date and then clicking on the “**Update graph**” button.

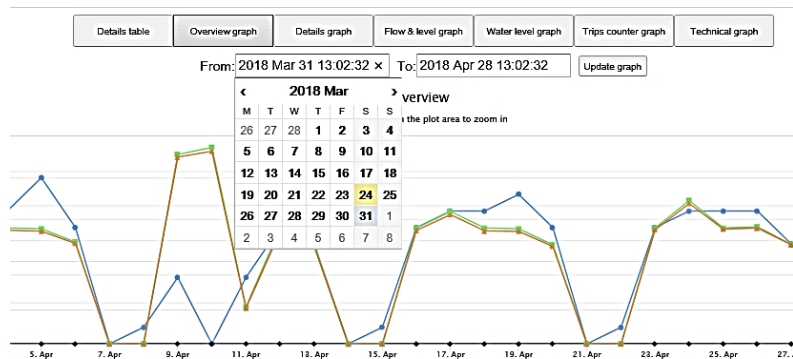


Figure 54 Select dates and update graph

14.7.2 Viewing graphs

– Zoom

You can zoom into a section of the graph by selecting an area.

On a PC: Click left mouse button and drag to select.

On a smart device: Use two fingers to select zoom area.
Reset zoom function – click on “**Reset zoom**” button

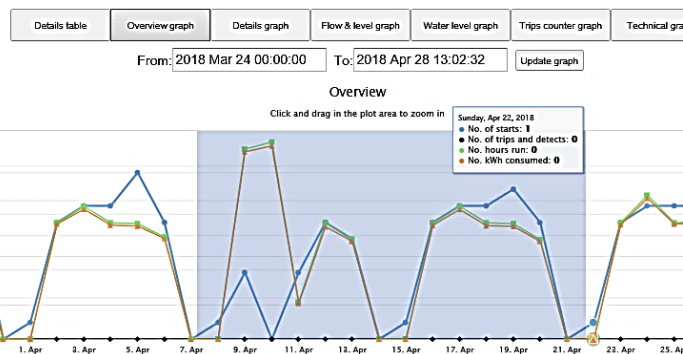


Figure 55 Zoom function

14.7.3 View data point values

Hover over any data point in all graphs to see the actual values

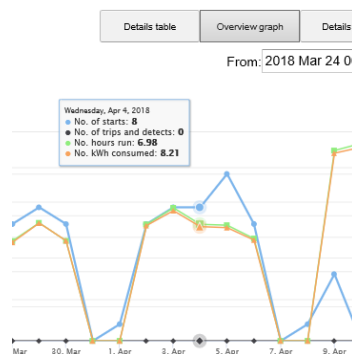


Figure 56 View data point values

14.7.4 View graph parameter

Graph parameters can be toggled on and off, allowing you to select specific graph parameters to view. Click on the specific parameter to the right of the graph to switch it off (greyed out). Click to switch it on (solid black).

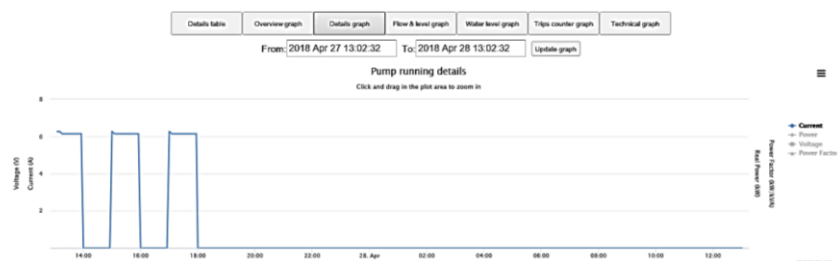


Figure 57 Toggle graph parameters on and off

14.7.5 Overview Graph

Starts – pump starts per day

Trips and detects – trips per day

Hours run – running hours per day

kWh consumed – daily electrical consumption

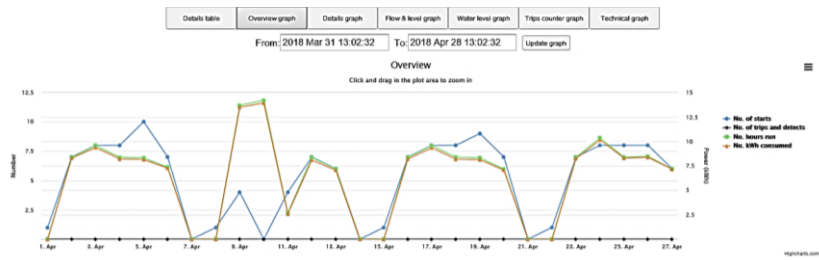


Figure 58 Overview Graph

14.7.6 Details graph

The details graph shows the motor and electrical parameters.

Current – motor amps

Power – power absorbed is higher than the motor rating by about 1.2 – 1.4 times

Voltage – average mains supply

Power factor – indicates level of active power absorbed

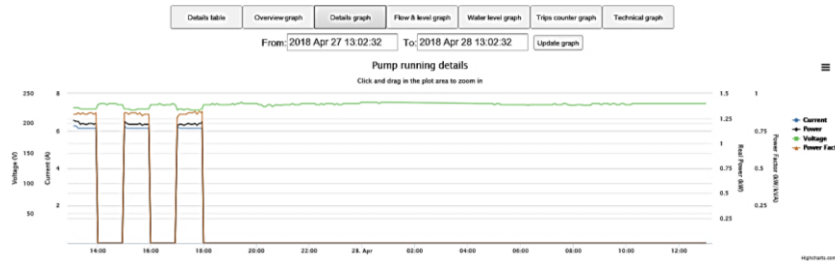


Figure 59 Details Graph

14.7.7 Flow & level graph

Water level – water level in meters H₂O (mH₂O) above level transducer

Pressure – pressure transducer reading in meters H₂O (mH₂O)

Flow rate – water flow rate in litres per minute

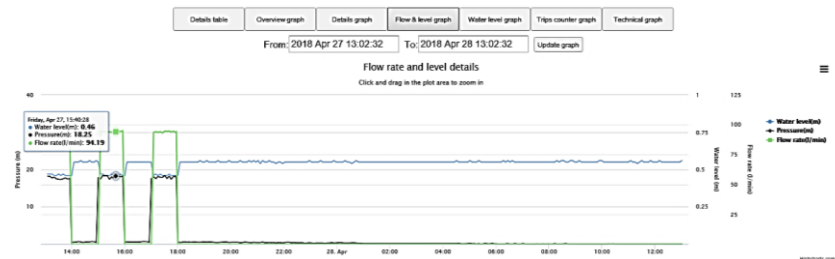


Figure 60 Flow & level graph

14.7.8 Water level graph

No. kl. pumped – water volume pumped per day in m³ or 1000 litre

Ave. water level (pump on) – average dynamic water level in mH₂O

Ave. water level (pump off) – average static water level in mH₂O

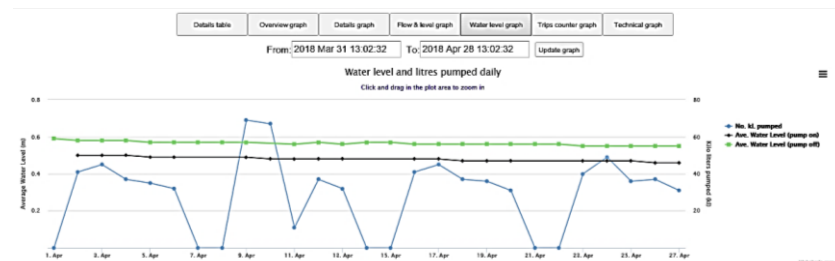


Figure 61 Water level graph

14.7.9 Trips counter graph

Daily number of:

Overloads – current overload

Underload – low shaft power

Overvoltage detected – supply voltage high warning

Undervoltage detected – supply voltage low warning

Overvoltage trip – supply voltage high

Undervoltage trip – supply voltage low

Unauthorised starts – contactor forced to operate

No. calibrations – times calibrated

No. Lock outs – severe overloads detected requiring intervention to start

No. Overload starts -

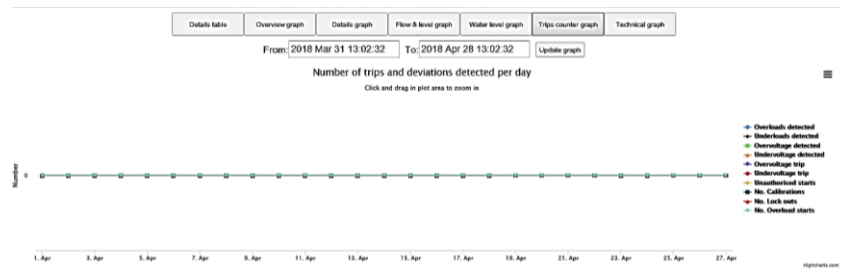


Figure 62 Trips counter graph

14.7.10 Technical graph

The technical details graph indicates anomalies by comparing daily maximum and average readings of the current, voltage and power.

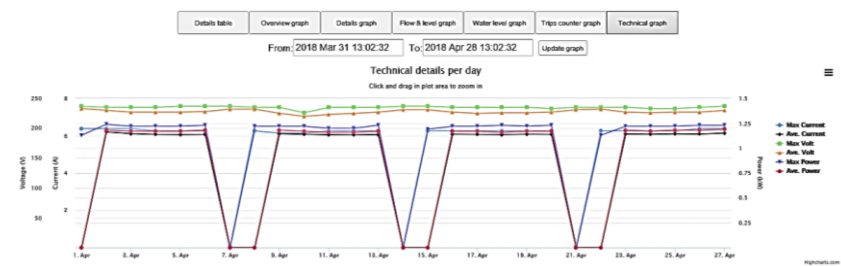


Figure 63 Technical graph

14.8 Pump Duty / Operating Point

The Pump Duty curve helps to determine if the pump is operating on curve and in the allowable middle third of the pump curve. Deviations from the normal duty point can also be detected. Pump wear and other anomalies can be detected in this manner.

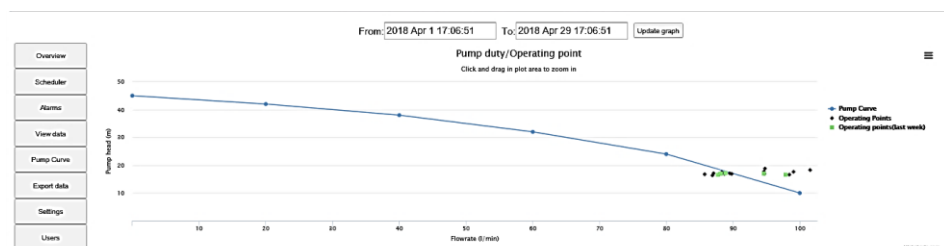


Figure 64 Pump Duty / Operating Point

14.9 Export Data

The export data function allows you to export data in CSV format for further processing and storage. Download the CSV file and save as a TXT file. Open with EXCEL as a comma delimited file. Data is now available to be used. Graphs can be plotted. Trends can be determined.

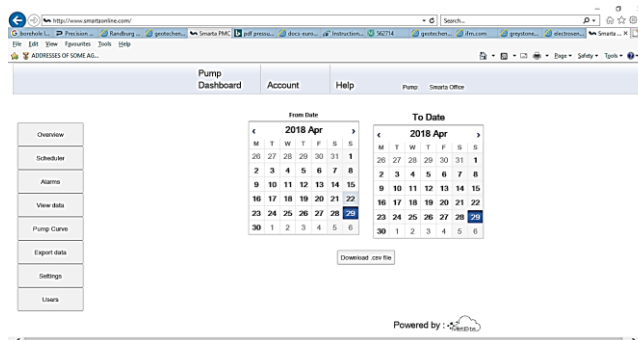


Figure 65 Date range selection for data export

Time Stamp	Current(A)	Volt(V)	Real Power(kW)	Apparent Power(kVA)	Power Factor(kW/kVA)	Mode(code)	Mode	Logger Temp (C)	Signal (%)	Analog_1 (Water Level (m))	Analog_2 (Pump Pressure (kPa))
2018-04-01 00:01	0	235	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:06	0	233	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:11	0	233	0	0	0	0	Standby	23	56	0.59	
2018-04-01 00:16	0	233	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:21	0	233	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:26	0	235	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:31	0	235	0	0	0	0	Standby	23	50	0.59	
2018-04-01 00:36	0	235	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:41	0	235	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:46	0	233	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:51	0	233	0	0	0	0	Standby	23	53	0.59	
2018-04-01 00:57	0	235	0	0	0	0	Standby	23	53	0.59	
2018-04-01 01:02	0	235	0	0	0	0	Standby	23	53	0.59	
2018-04-01 01:07	0	233	0	0	0	0	Standby	23	53	0.59	
2018-04-01 01:12	0	233	0	0	0	0	Standby	23	53	0.59	
2018-04-01 01:17	0	233	0	0	0	0	Standby	23	56	0.59	
2018-04-01 01:22	0	233	0	0	0	0	Standby	23	56	0.59	
2018-04-01 01:27	0	233	0	0	0	0	Standby	23	53	0.59	
2018-04-01 01:32	0	233	0	0	0	0	Standby	23	53	0.59	

Figure 66 Excel data extracted from CSV file downloaded and saved as TXT file

14.10 Settings

The Settings page contain the following options:

Notes – file events, actions and notes

General Pump Settings – record site and installation details

Analog Input Settings – set the field instrumentation parameters

Pump Performance Curve – record the pump curve data to utilise the pump curve

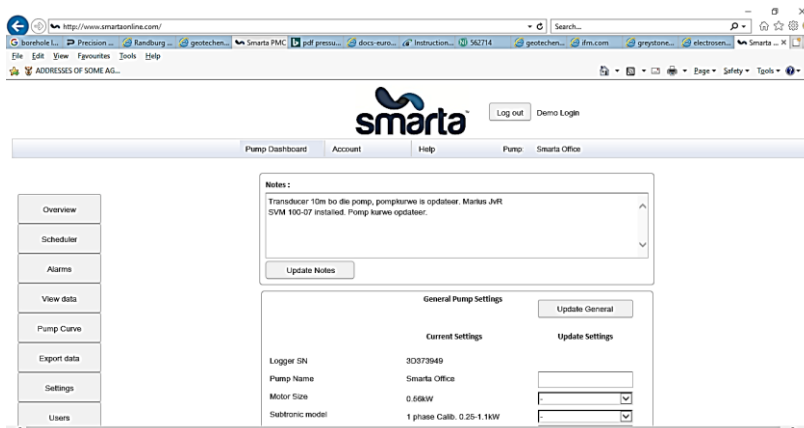


Figure 67 Settings page

14.10.1 Notes

Add notes to keep record of the site and site conditions. Click on the “Update Notes” button to make additions/changes permanent.

Notes :

Transducer 10m bo die pomp, pompkurwe is opdateer. Marius JvR SVM 100-07 installed. Pomp kurwe opdateer.

Update Notes

Figure 68 Notes section in Settings

14.10.2 General Pump Settings

Enter the pump or site name

Select the pump motor size.

Select the Subtronic/Blac Bocs model or the correct “calibratable” model range for DOL and generic controllers.

Set the current transformer (CT) primary and secondary values.

Select the correct division ratio to get the correct power reading on the website.

Record the pump depth (below surface) in meters.

Click on the “Update General” button to save changes.

General Pump Settings

Update General

Current Settings		Update Settings
Logger SN	3D373949	
Pump Name	Smarta Office	
Motor Size	0.56kW	-
Subtronic model	1 phase Calib. 0.25-1.1kW	-
CT Primary (eg. 75)	1	
CT Secondary (eg. 5)	1	
Division Ratio	4	-
Pump depth (m)	1.00	

Figure 69 General Pump Settings in Settings

14.10.3 Analog Input Settings

Refer to §8.

Enable field instruments in use.

Set the level transducer maximum range and depth of installation.

Set the pressure transducer maximum range.

Set the flow meter rate in litres per pulse.

Click on the “Update Analog Settings” button to save changes.

Analog Input Settings

Update Analog Settings

Analog inputs setup (20mA equivalent to)	Enabled?	Update Settings
Max cal. water level (m)	1.00	☒
Depth of water level probe (m)	1.00	☒
Max cal. pump pressure probe (m)	40.00	☒
Litre per pulse (l)	100	☒

Figure 70 Analog Input Settings in Settings Section

14.10.4 Pump Performance Curve

Enter the installed pump data to produce the pump curve for use with the pump duty information. Refer to §13.4.

Pump Proformance Curve

Update Pump Curve

Current settings		Update Settings	
	Flow (L/min)	Head (m)	
Pt 1	0	45	
Pt 2	20	42	
Pt 3	40	38	
Pt 4	60	32	
Pt 5	80	24	
Pt 6	100	10	

Figure 71 Pump Performance Curve set-up in Settings

14.11 Users

The Users activated can be viewed in the Users section. Level and Status are indicated.

Three levels of access are available:

Admin – full control over website, including “Edit User” and “Invite User”

User – can view and control pump

Viewer – can view pump

Edit user requires user email address and level to be set. Click “**Update user**” button. User can be deleted by clicking on “**Delete user**” button.

An administrator can “**Invite User**” to add new user. Click “**Invite new user**” once information has been entered.

14.11.1 SMARTA Invitation email

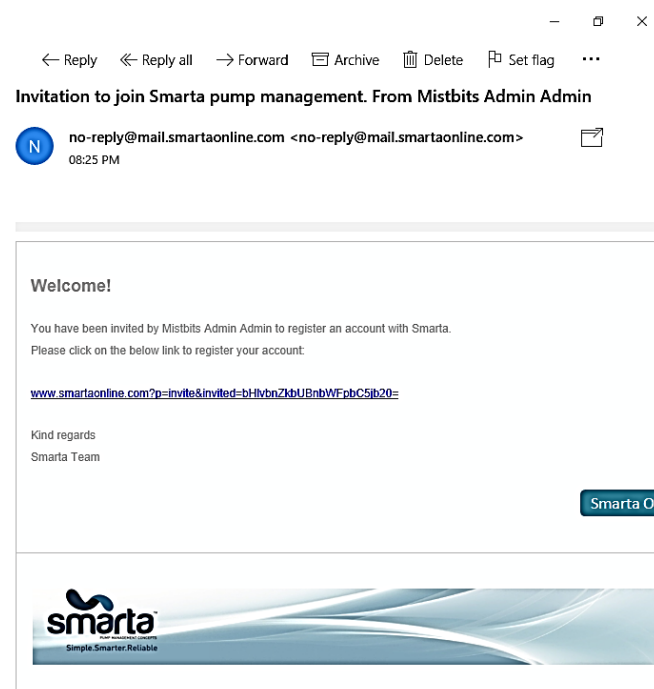
The invited user will receive an email message inviting him/her to register his/her account.

Users			
Name	Email Address	User Level	Status
Bwaira Mavhuto	bwaira@zz2.co.za	Admin	Registered
Pedri De Villiers	pedri@smarta.co.za	Admin	Registered
Cobus du Preez	cobus@zz2.co.za	Admin	Registered
Andre Erwee	andre.erwee@zz2.co.za	User	Registered
GERRIE DE JAGER	gerrie.dj@zz2.co.za	User	Registered
Johann Noffke	noffkej@zz2.co.za	Admin	Registered
Johan Fernandes	johan.fernandes@zz2.co.za	Admin	Registered

Edit User	
User bwaira@zz2.co.za	New user level Admin User Viewer
Update user Delete user	

Invite User	
Email address 	User level Admin
Invite new user	

Figure 72 Users view in Settings



14.11.2 Create a new account

The user registers his/her new account by:

- selecting a password,
- confirming the password,
- filling out the necessary personal information and
- agreeing to the Terms and Conditions

Click on the “Register” button to submit the form for User registration.

Create a new account
Welcome! You have been invited to create an account with Smartal

Account Information	
Email address	lyonvdm@gmail.com
Password	
Confirm password	

Personal Information	
Name	
Surname	
Phone number	
Company	
Country	South Africa
I agree to Terms and conditions? ☐	
Register	

15 Notes

[illegible]