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D714_x

Technical Information



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The D714x family is a range of IP65/IP67 low-power data logger/telemetry outstations. Three power options are available: the D7140 variant uses alkaline batteries that power the unit for up to 5 years, depending on usage and temperature conditions. The unit is available in a dc-powered (D7141) or mains ac-powered (D7145) configuration with internal battery back-up

The many capabilities and small size of the D714x means that it is ideally suited to a wide range of applications in the utilities and industrial markets. These include the monitoring of:

- Water Hydrology
 - Rain
 - River
 - Tidal
 - Flood Warning
- Zonal distribution
- Environmental
 - Temperature
 - Wind
 - Humidity
 - Pressure
- Industrial Pollution
- Water and Sewage
- Gas Installations

Data logging, telemetry and local intelligence (sequences) are all combined in the one unit and thus the need for separate outstations and data loggers is reduced.

As a telemetry outstation, the D714x unit is capable of reporting alarm conditions as they arise. Stored data can be retrieved at any time, either remotely over PSTN / CSDN links to a Masterstation, or locally via direct RS232 cable connection or IRDA interface.

The D714x can be configured to implement a wide variety of logging strategies. Powerful bespoke logging can be achieved when sequences are employed e.g. variable rate or combined event logging to fit a daily, weekly or monthly pattern. The unit may be fully configured using Outstation Programming Terminal for Windows (WinOPT) software, available from Dynamic Logic.

Key features in this unit include:

- Reduced power consumption using low-voltage electronics and advanced power management.
- Proven dual-microprocessor system with integral self-diagnostic electronics.
- Military-style connectors for easy cable installation and removal.
- “Green” - alkaline and NiMh batteries have lower environmental impact.
- Increased battery capacity to reduce service requirements.
- Intelligent charging techniques to maximise battery capacity and service life.
- High-resolution analogue measurement – up to 16-bit possible.
- Wide variety of analogue inputs supported.
- Enhanced protocol set – Dynamic Logic FSK and Modbus.
- Support for both incremental or absolute shaft encoders.
- Optional interface to radio, GSM and satellite equipment - configurable as RS232, RS485 or RS422.
- Improved operating temperature specification with internal monitoring.

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Parameter	Specification
Power Supply Options	10Vdc (using ten or twenty alkaline D cells) (D7140 unit) 11Vdc to 36Vdc (D7141 unit) 85Vac to 265Vac @ 47Hz to 63Hz (D7145 unit)
Internal Battery Back-up Options	One battery pack on both battery and dc powered units. Two NiMh (rechargeable battery back-up) battery packs on mains units.
Operating Temperature Range	-20°C to +70°C
Relative Humidity	0 to +95% @ +45°C (non-condensing)
Digital Inputs	8, expandable to 24 in blocks of 8 Input: volt-free contacts: closed < 1kΩ open > 100kΩ Input: open-collector (open-drain) transistor
Digital Outputs	2, expandable to 4 in blocks of 2 volt-free photoMOS relay outputs rated 24V ac/dc @ 0.5A
Analogue Inputs	4, expandable to 8 in blocks of 4 16-bit resolution max, 14-bit min. Accuracy ±0.05% Current, voltage, potentiometric 12Vdc and Vref pulsed sensor supplies with short-circuit protection
Counter Inputs (configurable as Digital Inputs)	4, expandable to 24 in blocks of 8 Inputs as per digital inputs 0 – 99999999 (eight decade)
Display	LCD: 2-rows, 16-characters EL illumination as an option
Serial Communication Ports	Two RS232 ports configured as one local (COM1), one internal for PSTN / CSDN modem (COM2), One optional port (COM3) configurable as RS232, RS485, RS422
Log size	>500KB
Sensor Connection	Low cost military-style circular connectors
Enclosure (W x H x D)	305mm x 190mm x 130mm
IP ratings	IP68 (enclosure), IP65 or optional IP68 (connectors)

The D714x range is designed to maximise energy efficiency and employ state-of-the-art power management circuitry. The unit conserves power by switching into a “sleep” mode whenever possible, where all but the highest priority functions are inactive. The unit “wakes” periodically to perform various housekeeping duties, such as:

- Reading of digital and shaft encoder inputs.
- Count rate update.
- Time log / analogue conversion.

In addition, the unit will stay awake while carrying out particular functions:

- Analogue alarm delay.
- Digital output active.
- All external communications.
- Sequence wake states.

The unit is designed to conduct wake-state functions with optimum speed and efficiency. In order to further conserve battery life, it is recommended that the above functions be configured with care, keeping wake-states to a minimum.

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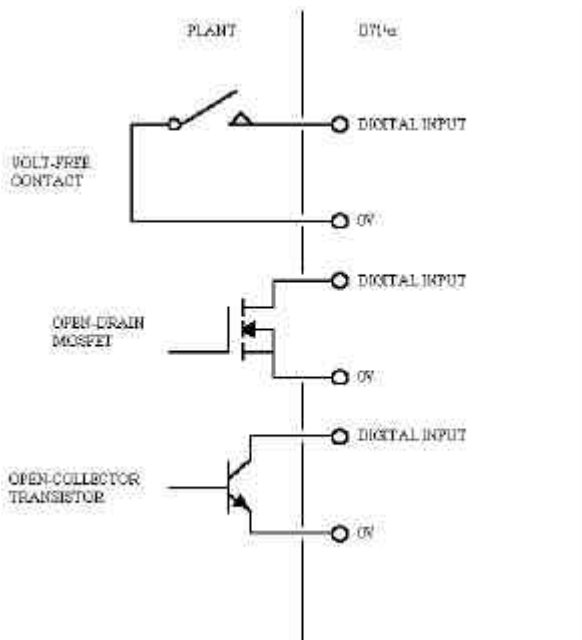
I/O Wiring

The D714x unit is fitted with circular military-type connectors to suit the I/O requirements of the unit. The connectors are rated to IP-67 on standard units, with IP-68 versions available for submersible variants. Unused connectors are fitted with dustcaps.

Note: where possible, the sensor wiring should have the signal and return wires running together as twisted pairs. In order to minimise noise-related problems, ensure that the sensor wiring is separate from any mains or three-phase supplies that may be present on site.

Digital Inputs

Up to twenty four digital inputs can be connected to a D714x unit. Volt-free contacts, open collector and open-drain inputs are supported as shown in the drawing below.



The digital inputs are protected against reversal, transients, ac mains interference and contact bounce.



Analogue Inputs

The D714x unit will support up to eight analogue inputs. The inputs are galvanically isolated from the unit and are configured using a range of plug-in Signal Conditioning Modules (SCM). Each supported sensor input type, and corresponding SCM number are listed in the following table:

Sensor Type	SCM Number
0 – 1 mA	1
0 – 10 mA	2
1 – 10 mA	3
0 – 20 mA	4
4 – 20 mA	5
0 – 1Vdc	6
0 – 2Vdc	7
0 – 5Vdc	8
1 – 5Vdc	9
0 – 10Vdc	10
Potentiometric	11

The required SCMs are specified at the customer order stage. The plug-in design allows field retrofits to be accomplished with relative ease.

The D714x unit is fitted with integral power supplies for sensor excitation. To save energy, the sensors are powered during the scan interval only. Two supply options are available:

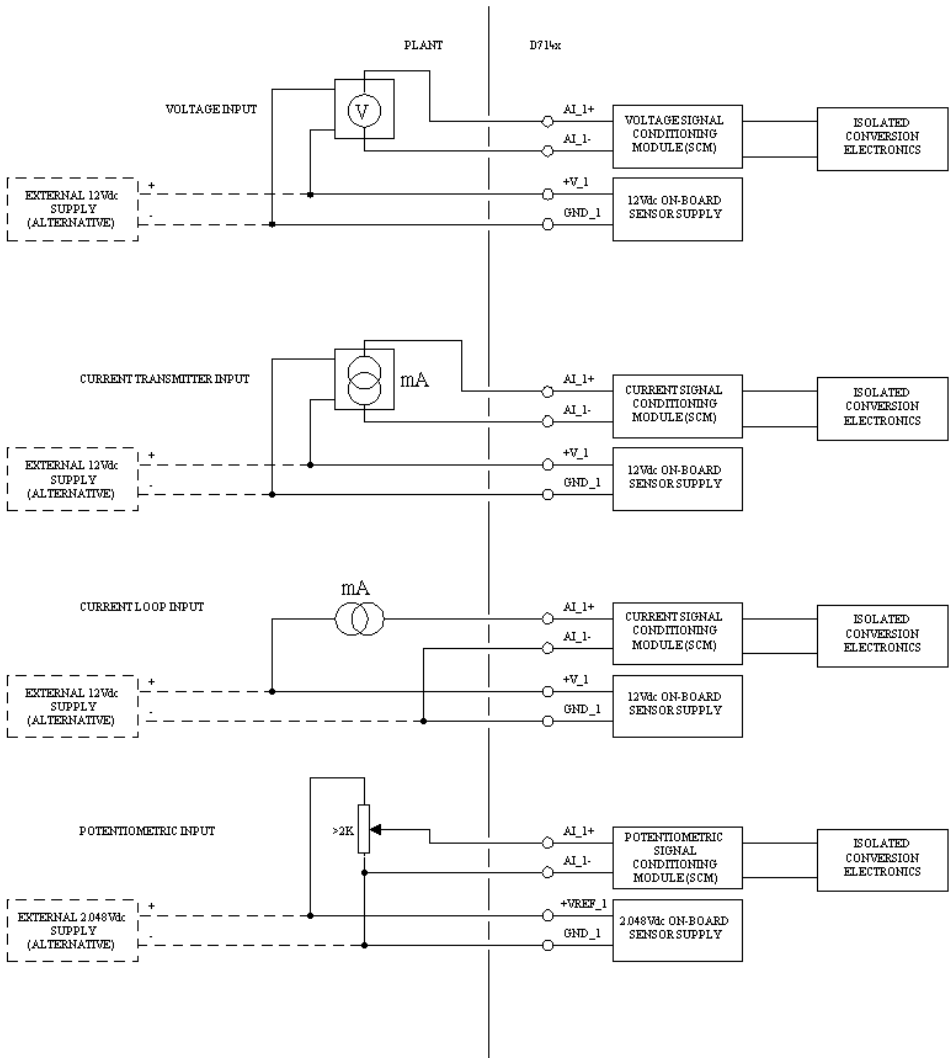
- 12Vdc for current and voltage sensors
- 2.048Vdc for potentiometric sensors

Using WinOPT, the unit may be configured with a pre-scan power-up time in order to power the sensor between 1ms and 1999ms prior to measurement.

The analogue inputs can be configured with up to four independent trip points. These trip points (Level Alarm Detectors - LADS) may be used to trigger an alarm dial-out or an 'event' logon breaching a set value in any direction.

The illustration over the page shows example wiring for the supported sensor types.

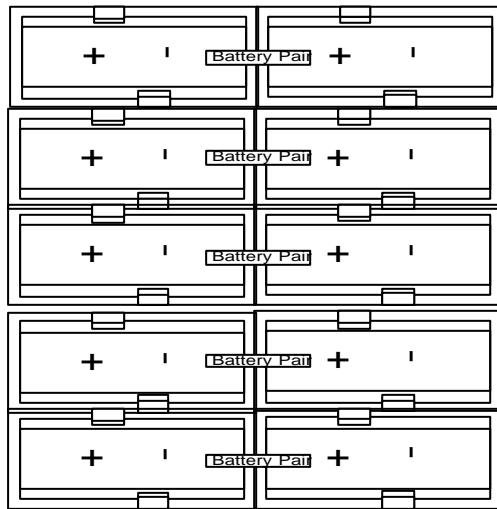
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D7140 Battery Powered Outstation / Logger Alkaline Battery Power Supply

The D7140 is the battery-powered variant of the D714x range and is designed to operate from up to twenty alkaline 'D' cells on two power supply boards. The battery holders are arranged in two arrays of ten. Each array on a power supply board is shown below.



Alkaline Battery Holder Array (D7140)

Electrical power is applied to the D7140 as soon as the last battery is inserted into the battery holder. The working voltage of the D7140 is nominally 10Vdc. The condition of each battery array is monitored by the system and alerts are generated if faults are detected. In addition, the gradual decline in battery array voltages is measured and when the levels drop below defined thresholds, the unit can be configured to generate an alarm dial-out.

The gentle slope of the alkaline discharge curve means that low-battery warnings can be generated far in advance of complete power failure, allowing reasonable time to change the cells. Eventually, when the end-of-discharge-voltage (EODV) is reached, the unit discontinues all I/O activity in order to extend the battery life, safeguard plant and preserve data. The unit will remain in this ultra low-power mode until the batteries are replaced.

A dedicated fuse adjacent to the holders protects each battery array. The fuse will blow if the batteries are inserted the wrong way round.



D7145 Mains Powered Outstation / Logger Back-up Battery Power Supply

The mains powered variant in the D714x range can be connected to an 85Vac to 265Vac supply at 47Hz to 63Hz. The mains supply is protected with a slow-blow 20mm fuse. This fuse is designated F1 and is located on the mains power supply module.

In the event of external supply failure, back-up power on some units is provided by two 12Vdc battery packs. These packs are available from Dynamic Logic and are available with NiMh cells fitted.

The D7145 units feature comprehensive battery management circuitry, designed to charge NiMh cells safely and effectively. The batteries are conditioned to maximise capacity and service life and are monitored to ensure availability of a reliable back-up supply.

Each pack is connected to a conditioning circuit that controls the battery charge and discharge cycles. There are four modes of operation, listed as follows:

- **Trickle charge**
The battery packs are subjected to a trickle charge regime to overcome self-discharge.
- **Fast charge**
The battery packs receive full-rated charge current for up to eighteen hours.
- **Discharge**
Periodically, a battery pack in turn is completely discharged to prevent a reduction in capacity and then fully recharged. This cycle is then repeated for the other battery pack. The packs are independent so one can supply the back-up power while the other is in a discharged state.
- **Charge and discharge terminated**
This mode is implemented if a battery pack is not connected or faulty. In addition, the charge / discharge regime is suspended if the operating temperature drops below 0°C.

The battery pack capacities are measured periodically by the system. If a pack is faulty or its capacity has dropped below a minimum threshold, the unit can be configured to generate an alarm dial-out.



D7141 DC Powered Outstation / Logger DC Power Supply

The dc-powered variant in the D714x range can be connected to a 11Vdc to 36Vdc supply. The dc supply is protected with a slow-blow 20mm fuse. This fuse is designated F1 and is located on the dc power supply module.

Battery back-up is provided in the event of mains failure by alkaline batteries that are not charged during normal operation. This allows the unit to dial out and report the mains failure while continuing to operate for up to one year without a dc supply, depending on ambient temperature and usage during this time.

All units are supplied with a range of self diagnostics. These are shown by the unit as pseudo analogue/digitals. The pseudo digitals provide a primary supply failure (where applicable) and a test dial facility, these are pseudo digital 1 and 2 respectively. The pseudo analogues provide information such as:

- PSTN power time
- PSTN dial count
- PSTN ring count
- PSTN failure count
- Battery 1 voltage level
- Primary supply voltage
- Unit ambient temperature °C
- Battery charging state

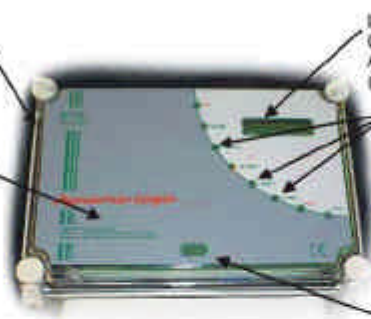
Alarm dial-outs may be generated on these inputs, thus providing the facility to inform the Masterstation of failures on site.

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D7000 Telemetry Outstation / Logger Series

10Vdc (using six or ten alkaline D cells) (D7140)
 11Vdc to 36Vdc (D7141 unit)
 85Vac to 265Vac @ 47Hz to 63Hz (D7145 unit)

Internal Battery Back-up
 One battery pack on dc powered units. Mains uses two NiMH providing 3 days back-up approx. (rechargeable battery back-up)
 DC units use 'D' cells providing 1 year back-up



LCD 2 line 16 Character
 LCD Freeze function
 Auto-Power save
 (Not available on D7190 series)

Eight LED indicating :-
 Mains/Battery
 System Active
 Comm port 1 active
 Comm port 2 active
 Local port active
 Infra Red IRDA active
 Test Dial

Local Infra Red comms activated via magnetic switch

Communication Options -
 Public Switched Telephone Network - PSTN
 GSM - Short Message Service (SMS)
 SecureStream 300 (SS300) network
 Private Wire (PW)
 Radio - MPT1328/9 now EN300220 - unlicensed
 MPT1411 - licensed



The connectors are rated to IP-65 on standard units, with IP-68 versions available for submersible variants. Unused connectors are fitted with dustcaps.

Data logging capacity available in extended blocks of memory :

Type	Standard	+ 1 exp.	+2 exp.
Digital Event	98,304 logs	185,685 logs	273,066 logs
Analogue Event	73,728 logs	139,264 logs	204,800 logs
Analogue Time	98,304 logs	185,685 logs	273,066 logs

Quantity dependent upon mix.
 Single channel Logging at 15min intervals = **2.8 Years** **5.3 Years** **7.8 Years**

Dynamic Logic Limited
Taxi Way, Hillend Industrial Park
Dalgety Bay
Dunfermline
Fife
KY11 9ET
United Kingdom
Tel: +44 (0) 1383 822911
Fax:: +44 (0) 1383 824740
E-mail: info@DynamicLogic.co.uk
Website: www.DynamicLogic.co.uk

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