XRC^{G4}
XSeries^{G4} Products
Remote Controller

INTRODUCTION

XSeries^{G4} devices, from the Totalflow division of ABB provide functionality only possible through the convergence of RTU, PLC and flow computer concepts. Representing a unique milepost in the development of remote, low power, powerful measurement and control devices, ABB Totalflow's XSeries^{G4} products are available in one of two product families;



- e**X**tendable **F**low **C**omputers (XFC^{G4})
- e**X**tendable **R**emote **C**ontrollers (XRC^{G4})

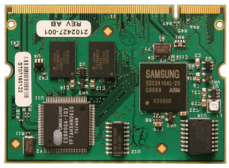
This datasheet focuses on the XRC^{G4} products, XSeries^{G4} Remote Controllers (RTUs). The XRC^{G4} is the "fourth generation" of Totalflow RTUs. Benefits and features of these particular products include:

- Automation, control, alarming and data logging capability
- Base IO targeted at low cost automation projects
- Local display and optional keypad
- Quick, easy installation
- Flexible communications
- Onboard Ethernet
- Comprehensive custody quality math and data history
- Backward compatibility
- Extendable hardware and software

With low power, accuracy and system integrity built in, these devices are proven daily on thousands of sites. Totalflow products provide users the best opportunity for successful projects – site by site or system by system.

DESCRIPTION

The XRC^{G4} features a powerful 203Mhz ARM920T 32 bit microprocessor and Windows CE operating system. The XRC^{G4} utilizes a unique "engine card" design. The engine card contains the processor, application firmware and memory components. This allows the user to move the engine card with all programming intact from one device to another if necessary. The processing and memory capability of this device, allows the user to run more applications faster than ever before. Up to twenty (20) AGA3 measurement tubes performing full calculations once a second and twenty (20) advanced plunger lift applications may be running in one XRC^{G4}. In it's base configuration, this unit is equipped with standard IO designed to meet the requirements of many low cost automation and measurement projects. The base IO includes five (5) analog inputs (0-10 volts DC), 4 digital outputs and 4 digital inputs which can be configured as either status inputs or high speed pulse accumulator inputs.



IO modules can be added to extend the hardware IO capability.

XFC^{G4} and XRC^{G4} devices are based on the same software environment. Applications available in one are also available in the other, including custody transfer measurement applications. The two significant differences between XFC^{G4} and XRC^{G4} devices are hardware.

- XFC^{G4} devices include an integral multivariable transducer and XRC^{G4} devices do not.
- There are more base IO points on XRC^{G4} devices than on XFC^{G4} devices.

	XFC^{G4} XSeries^{G4} Flow Computers	XRC^{G4} XSeries^{G4} Remote Controllers
Integral Transducer	Yes	No
AI	2	5
DI	2 (DI or PI)	4 (DI or PI)
DO	2	4

Multi-tube capability (up to 20 tubes) is available in each unit and is easily invoked with a few configuration changes and interface connection to external transducers, either digital or analog.

Each unit is powered by an internal battery that can be solar charged (or other suitable DC supply) for remote unattended operation. Several charging options are available.

Communications interface cables and equipment can be installed at the factory, ready for quick field installation.

Checking and modifying configuration and calibration is accomplished with ABB Totalflow's PCCU32 laptop software running on a 32-bit Windows operating system.

In addition to the local configuration port, two serial communications ports are supplied with the standard unit. These ports are modular and user selectable for RS232 and/or RS485. An additional port may be added using a TFIO Communications Module.

One integrated 10Base-T Ethernet port for network connectivity is standard and a USB port for Flash download and local configuration is available as an option.

HARDWARE MODULARITY

Hardware functionality of XSeries[G4] devices can be extended in a flexible and simple way by adding modular IO as needed.

Totalflow's TFIO modules are designed to accommodate low power, harsh environments at economical cost. The system recognizes the module types automatically and configures the IO Scanner subsystem accordingly.



Supported TFIO Modules Include:

- Analog In (8 channel)
- Analog Out (4 channel)
- Binary (DI, DO, PI-8 channels, software selectable)
- RTD (4 channel)
- Thermocouple (4 channel)
- Valve Control (digital or analog)
- Communications (software selectable RS232, 485, 422-1 channel)

For more detailed information about TFIO modules request information on datasheets 2101105 through 2101112.

SOFTWARE MODULARITY

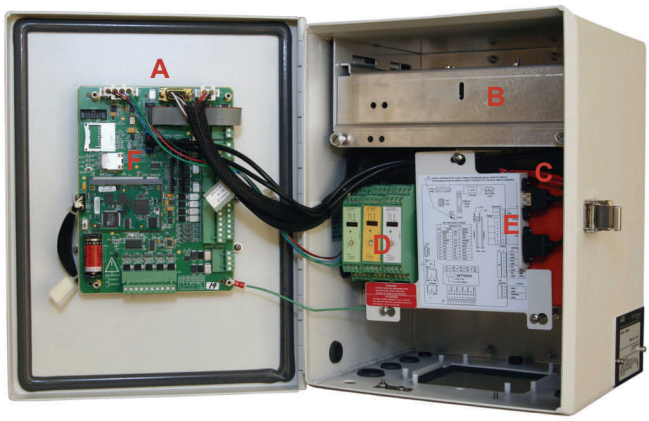
The software design represents significant modularization through use of object oriented design principles. This allows a flexible and stable real time environment. Totalflow supplied objects (applications) can be enabled in our factory or by the user, one or more times on the same device. It is this framework that allows the support for multi-tube measurement. Supported Software applications continually grow, but a sample of standard applications include:

- AGA3 orifice meter run
- ISO 5167 orifice meter run
- VCone meter run
- AGA7 meter run (rotary/turbine/ultrasonic)
- Coriolis Gas (serial or pulse input)
- PAD controller for multi-well sites
- Advanced Plunger-Lift
- Real-time Data logger (trending)
- Valve Control (Feedback controller)
- RAMS (Alarming, Exception Reporting)
- Operators (simple custom math / logic)
- IEC 61131 (ISaGRAF)
- Selectable Units (user selectable engineering units)
- Display / Keypad Handler
- IO subsystem Handler
- Tank Level Application
- Therms master or slave applications for on-line chromatograph interface
- Multiple protocols (Totalflow native low power, Modbus slave (RTU/ASCII), Modbus master (RTU/ASCII), LevelMaster, Btu 8000/8001, ABB 267CS/269CS XMV Multivariable, and others)

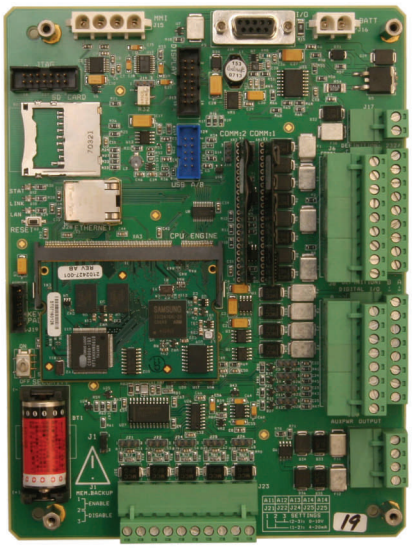
XSERIES[G4] REMOTE CONTROLLER FEATURES

- 203Mhz ARM920T 32 bit microprocessor
- Windows CE operating system (allows for a single software development environment for all G4 products)
- Integrated Ethernet 10Base-T port (full networking capabilities)
- USB host and USB device ports (ver 1.1): used for flashing new firmware and may be used as a high speed local configuration and collection port
- SD Card capability (future non-volatile memory expansion)
- Significant hardening against over-current / transients
  - ◊ Positive Temperature Coefficient, resetting fuses and transient protection on
    - * VBATT and SWVBATT Outputs
    - * Each of the Digital Outputs
    - * Battery Charger Input
- Base IO on XRC[G4] main electronics board
  - ◊ 5 Analog Inputs
  - ◊ 4 Digital Inputs (all can be configured as hi-

speed PI inputs)
  - ◊ 4 Digital Outputs
  - ◊ Battery Voltage
  - ◊ Charger Voltage
- Low power design operating as low as 8 ma (<100 mW)
- Aluminum powder coated enclosure (3R)
- Flexible accommodation of communications hardware
- Cost effective communications kits
- Stable time base (accurate integration)
- Rechargeable, lead acid batteries
- Solar, AC or DC charging options
- User selectable simple dual level security code data protection or enhanced user configurable Role Based Access Control (RBAC)
- Custody transfer applications
  - ◊ Monitors user limits for detection, and reporting of abnormal conditions
  - ◊ Defaults to 40 Days of hourly and 50 Days of daily data. User configurable.
  - ◊ Defaults to 200 Events. User configurable.
  - ◊ Complies with API 21.1 standard for custody transfer measurement devices
  - ◊ Flow and energy calculations per AGA3-85, AGA3-92, AGA-7, AGA-5, and ISO 5167
  - ◊ Meets Flow Computer requirements as stated in AGA Report No. 9, “Measurement of Gas by Multi-path Ultrasonic Meters”.
  - ◊ Super compressibility calculations per NX-19, AGA8-92 Gross or Detail, ISO 12213
  - ◊ All calculations performed once per second (user configurable to longer period)
  - ◊ Flow retention during user transducer calibration
  - ◊ Selectable 3 or 5 point user calibration of Analog Inputs
  - ◊ User definable DP no flow cut-off
- Hazardous Area Certification: CSA C/US, ATEX and IECEx (6895 model: CSA C/US only)
- Real time clock that continues running on lithium battery (maintains data backup)
- Advanced embedded data logger (Trending)
- Programmable alarm filtering
- Exception reporting capability
- Multiple protocol options including Totalflow packet protocol, various Modbus protocols including Enron Modbus and others
- User programmable Modbus register maps (both slave and master)
- User programmable math and logic sequences
- IEC 61131 Capability (ISaGRAF)
- Valve Control and Nominations Capability
- PID Control
- Plunger Lift (up to 20 applications per unit)



A. XRC^{G4} Board
B. Communications Equipment Compartment
C. Battery Compartment
D. TFIO Modules
E. USB (Host & Device)
F. Ethernet Port



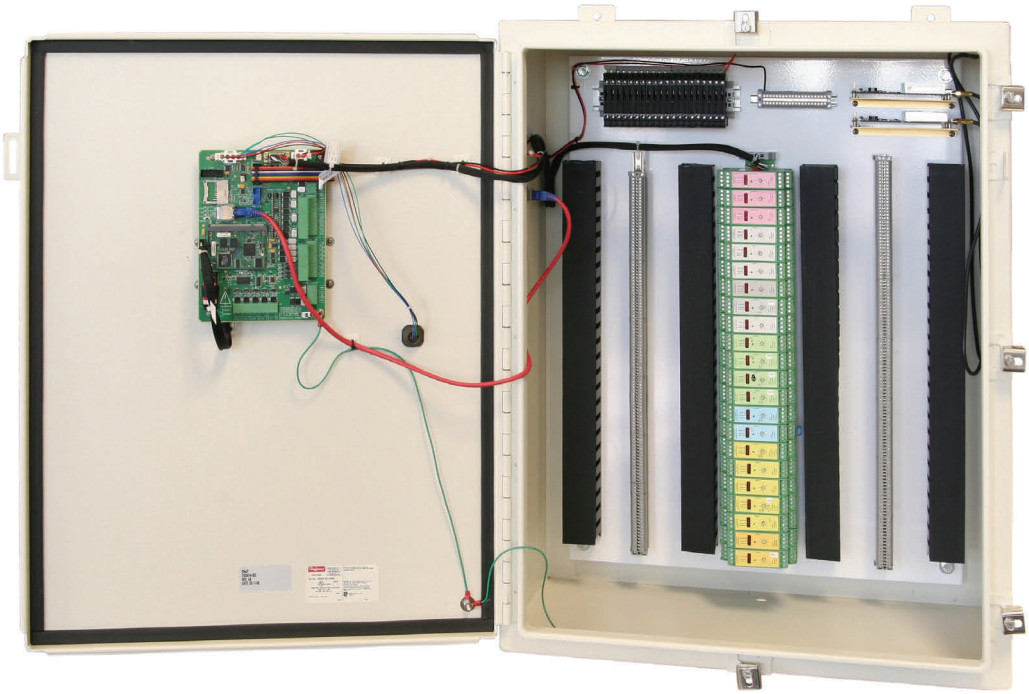
General Specifications		XRC^{G4} 6490	XRC^{G4} 6790	XRC^{G4} 6890
Dimensions	Width	12.756 in. (324.00 mm)	14.920 in. (379.53 mm)	20.090 in. (510.29 mm)
	Height	17.230 in. (437.64 mm)	21.845 in. (554.86 mm)	28.910 in. (734.32 mm)
	Depth	10.269 in. (260.83 mm)	13.710 in. (348.23 mm)	15.520 in. (394.21 mm)
Installed Depth	(Pipe Mount)	11.584 in. (294.23 mm)	14.56 in. (369.82 mm)	16.82 in. (427.23 mm)
	(Wall Mount)	11.019 in. (279.88 mm)	14.00 in. (355.60 mm)	16.26 in. (413.00 mm)
Weight (w/o Battery)		Approx. 15 lbs. (6.8 kg)	Approx. 29 lbs. (13.1 kg)	Approx. 45 lbs. (20.6 kg)
Max IO Modules		3	6	14
Max Battery Capacity		26AH	42AH	140AH
Certification (Hazardous Location Classification)		CSA C/US Class 1, Division 2, Groups C & D T4 -40°F to +140°F ATEX Zone 2, Sira 10ATEX4138X, Ⓔx II 3G Ex nA IIB T3 Ta = -40°C to +60°C (meets European Union Directive 94/9/EC) IECEx CSA09.0013X, Ex nA IIB T3 (-40°C ≤ Tamb ≤ +60°C)		
Mounting		Wall, pipe, or direct		
Operating Temperature (ambient)		-40°F to 140°F (-40°C to 60°C)		
Humidity		0 - 95% non-condensing		
EMC Requirements		EMMISSIONS: *European Regions:* EN55022: 1996 Class B Emissions (Radiated & Conducted) *North America Regions:* CFR 47, Part 15, Subpart B, Class B, FCC Emissions ICES-003 Issue 4 CAN/CSA-CEI/IEC CISPR 22:02, Class B ITE Emissions AS/NZS CISPR 22-2004 (Australia/New Zealand)		
		IMMUNITY: *European Regions:* EN61000-6-1: 2001 Immunity EN61000-4-2 ESD: 1995 ± 8 kV Air, ± 4 kV Contact EN61000-4-3: 2005 RF Immunity, 3/10 V/m EN61000-4-4 EFT: 2004, 1 kV EN61000-4-6: 2005, Conducted Susceptibility, 3/10 Vrms EN61000-4-8: 1994, Power Frequency Magnetic Field 10 A/m		



General Specifications		XRC^{G4} 6895
Dimensions	Width	24 in. (609.6 mm)
	Height	30 in. (762 mm)
	Depth	13.5 in. (342.9 mm)
Weight		Approx 60 lbs. (27.2 kg)
Max IO Modules		22
Fused Power Terminals (DIN rail mounted)		20
Mini Terminal Connections (mini DIN rail mounted)		259
Certification		CSA C/US Class 1, Division 2, Groups C & D T4 -40°F to +140°F (model 6895 does not have ATEX or IECEx Zone 2 Certificates of Conformity)
Does not support an Internal Battery		

XRC[G4]	
Power	Nominal 12 VDC battery
Charger	Solar or 15 VDC, 30 Watt Maximum
Memory	• Windows CE Operating System, Application programs, and Configuration Files stored in 32 Megabyte Flash memory • Program execution and data stored in 16 Megabyte Pseudo Static RAM. (lithium battery backup)
Communications Ports	• 1 - dedicated – PCCU (Local Configuration Port) • 2 - RS232 or RS485 (via board insertion modules) baud rates up to 115,200 • 1 - USB 1.1 Host port - optional • 1 - USB 1.1 Device port (may be used as high-speed local configuration port) - optional • 1 - 10 Base-T Ethernet port
Enclosure	Powder coated aluminum; Type 3R
LCD Interface	Dedicated interface for 2 X 24 Liquid Crystal Display (LCD)
Keypad Interface	Dedicated interface for optional ABB supplied keypad
IO Expansion	I^2C Bus Interface for TFIO Modules
Security Switch	Dual-Level Security Switch On-Board
Time Base Stability	± 7.5 ppm (parts per million)
IO Scan Rate	1 Time per Second (1 Hz)
AGA3/AGA7/ISO5167/VCone Calculations	Calculations are tested and verified to be within ± 50 parts per million as stated in API 14.3.4
Analog Inputs ***(on board)***	• 18 Bit maximum resolution (0.00038% FS); 16 Bit nominal resolution (0.0015%FS) • 5 single-ended channels • Voltage Mode: 0 - 10 V • Current Mode: 0 - 20 mA* • Maximum voltage mode input before soft over-range: 10.7 V • Maximum allowable continuous input current: 22.8 mA • Typical input impedance Voltage Mode: 91.24K Ohms • Typical input impedance Current Mode: 249.3 Ohms * *For 4 -20 ma inputs, an external power source may be required if device requires more than 12 VDC.*
Digital Inputs/Pulse Inputs ***(on board)***	4 inputs configurable as active or passive with optional software de-bounce. • Open circuit voltage: 5 VDC (Internally pulled up to 5 VDC nominal) • Short circuit leakage current: - 395 uA typical • Input capacitance: 0.1 ufd typical • Maximum allowable voltage range on input: - 0.5 VDC to 15 VDC • Maximum frequency input 100 Hz @ 50% duty cycle with de-bounce enabled • Maximum frequency input 20 KHz @ 50% duty cycle with de-bounce disabled • Dry Contact (Form A), Open Collector or Active Voltage • Minimum contact resistance to activate input: 1000 Ω • Voltage threshold to deactivate the input: 3.1 V (referenced to GND terminal) • Voltage threshold to activate the input: 0.5 V (referenced to GND terminal) • Conductor pairs must be shielded to prevent spurious signals

XRC[G4]	
Digital Outputs (on board)	4 open channel FET transistor switches • Open circuit voltage: 0 VDC • Short circuit leakage current: 0 uA typical • Output capacitance: 1000 pF typical • Maximum allowable voltage range on output: - 0.5 VDC to 26.5 VDC • Open drain FET type • "ON" resistance: 0.1 Ω typical (including PTC fuse resistance) • Maximum pulse current: 3 A for 5 seconds • Maximum continuous sink current: 2 A



Power and Productivity
for a Better World. ™

www.abb.com/totalflow
www.abb.us
www.abb.com

ABB Inc.
Totalflow Products
7051 Industrial Blvd.
Bartlesville, OK 74006
Tel: (918) 338-4888
Fax: (918) 338-4699
(800) 442-3097

For more information, please contact your local ABB Totalflow representative or visit our website.