ABB MEASUREMENT & ANALYTICS | DATA SHEET

# XRC$^{G5}$

## Remote controller

# Measurement made easy

## An upgraded path to new digital technologies

**This new generation of Flow Computers and RTUs offers a low-power, high-reliable microprocessor-based unit with a new Linux operating system, persistent memory, and new connectivity, combined with the same wide range of measurement, monitoring, and alarm applications for remote oil and gas systems. It also provides an upgrade path to new digital technologies and protocols such as MQTT, and a secured wireless connection (WiFi-Access Point or Bluetooth).**

## Forward compatibility

- Built to be compatible for future applications

## New features

- Supports Wi-Fi access point and Bluetooth
- New pulse inputs voltage range

## Integral multivariable

- Accuracy of ±0.05% of user calibrated spans from 20% to 100% of URL
- Ambient temperature effect of ±0.075% of URL Stability (for 12 mo) of ±0.1% of URL

## Backward compatibility

- Same hardware form and factor of previous generation
- Majority of the features such as on board I/O, wirings, and software configurations are compatible with G4 XFC & XRC devices

## Certifications (hazardous location classification)

- CSA C/US Class I, Div 2, Groups C&D T3 -40°F (-40°C) to +140°F (+60°C)
- ATEX: Sira 10ATEX4138X II 3G Ex nAc IIB Ge T3 Ta= -40°C to +60°C (European Union Directive 2014/34/EU)
- IECEx: CSA09.0013X, Ex nAc IIB Ge T3 (-40°C ≤ Tamb ≤ +60°C)

## Overview

XSeries$^{G5}$ devices are the “fifth generation” of flow computers and RTUs that continues to provide a large set of functionality related to RTU, PLC and flow computer applications, but now with a forward looking microprocessor and a Linux environment. XFC$^{G5}$ and XRC$^{G5}$ devices are based on the same software environment, including custody transfer measurementand control applications. The two significant differences between XFC$^{G5}$ and XRC$^{G5}$ are related to their hardware:

- XFC$^{G5}$ devices include an integral multivariable transducer, and XRC$^{G5}$ devices do not.
- There are more base I/O points on XRC$^{G5}$ devices than on XFC$^{G5}$ devices.

| | **XFC$^{G5}$ flow computers** | **XRC$^{G5}$ remote controllers** |
|---|---|---|
| Integral transducer | Yes | No |
| AI | 2 | 5 |
| DI | 2(DI or PI) | 4 (DI or PI) |
| DO | 2 | 4 |

This datasheet focuses on the XSeries$^{G5}$ remote controllers XRC$^{G5}$. Benefits and features of these particular products include:

- Automation, control, alarming and data logging capabilities
- Base I/O targeted at low-cost, automation projects
- Flexible communications
- New PI operational range
- New WiFi and Bluetooth for local wireless connectivity
- Onboard Ethernet
- Backward compatibility
- Extendable hardware and software

## Description

The XRC$^{G5}$ features a 399Mhz, Tl ARM Cortex AM335X, 32-bit microprocessor with an Embedded Linux operating system. The base unit is equipped with standard I/O designed to meet the requirements of many low cost automation and measurement configurations, and additional I/O modules can be added to extend the hardware I/O capabilities.

The processing and memory capability of the XRC$^{G5}$ allows the user to run more applications faster than ever before. Up to twenty (20) AGA3 measurement tubes performing full calculations once a second or eight (8) wells with fully configured control and measurement applications for liquid and gas.

The XRC$^{G5}$ has an on-board configuration of five (5) analog inputs (0 to 10 volts DC), four (4) digital outputs and four (4) digital inputs which can be configured as either status inputs or pulse accumulator inputs and two different operation voltage ranges.

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

A local configuration serial port, two communications ports are supplied with the standard unit. These ports are modular and user selectable for RS232 and/or RS485.

One integrated 10/100 Base-T Full duplex Ethernet port for network connectivity as standard offering together with WiFi and Bluetooth is available as well as a local wireless connectivity for Flash download and local configuration.

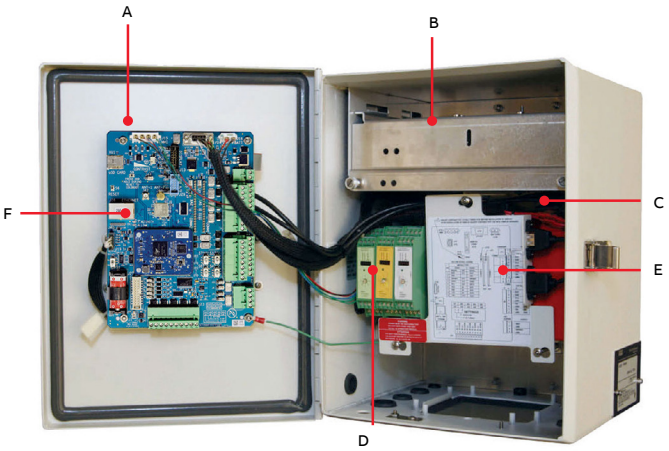
## XSeries$^{G5}$ remote controller features

- 399Mhz, Tl ARM Cortex AM335X, 32-bit microprocessor
- Embedded Linux operating system (allows for a single software development environment for all G5 products
- Integrated Ethernet 10/100Base port (full networking capabilities)
- Wireless Access Point (Wi-Fi) which support up to 10 client connections
- On-Board Bluetooth Capability which can be used for configuration & collection.
- USB host and USB device ports (ver 2.0): used as a high speed local configuration and collection port
- 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 I/O on XRC$^{G5}$ main electronics board:
  - 5 analog inputs
  - 4 digital inputs (all can be configured as hi speed Pl inputs Configurable I EC & STD Pl 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)
- Hazardous Area Certification: CSA C/US, ATEX and IECEx
- Real-time clock that continues running on lithium battery
- Additional real-time clock back-up for 48 hrs without lithium battery

## Hardware modularity

Hardware functionality of XSeries$^{G5}$ devices can be extended in a flexible and simple way by adding modular I/O as needed. ABB's TFIO modules are designed to accommodate low power, harsh environments at economical cost. The system recognizes the module types automatically and configures the I/O Scanner subsystem accordingly.

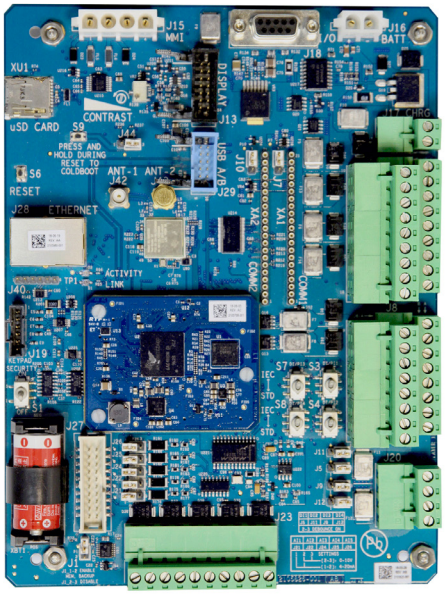
For more detailed information about TFI0 modules, request information on data sheets 2101105 through 2101112.




A XRC$^{G5}$ board
B Communications equipment compartment
C Battery compartment
D TFIO modules
E USB (host & device)
F Ethernet port

## Software modularity

The software design supplied 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, well optimization, site operation, and engineering tools that allows customization to each particular installation.



| Model comparison | XRC$^{G5}$ 6490 | XRC$^{G5}$ 6790 | XRC$^{G5}$ 6890 |
|---|---|---|---|
| Dimensions | 12.76" wide x 17.23" high x 10.27" deep<br>324mm x 437.64mm x 260.83mm | 14.92" wide x 21.85" high x 13.71" deep<br>379.53mm x 554.86mm x 348.23mm | 20.09" wide x 28.91" high x 15.52" deep<br>510.29mm x 734.32mm x 394.21mm |
| Installed depth (pipe mount) | 11.584" / 294.23mm | 14.56" / 369.82mm | 16.82" / 427.23mm |
| Installed depth (wall mount) | 11.019" / 279.88.. | 14.00" / 355.60mm | 16.26" / 413.00mm |
| Approx. weight (w/o battery) | 15lbs. / 6.8kg | 29lbs. / 13.1kg | 45lbs. / 20.6kg |
| Max I/O modules | 3 | 6 | 14 |
| Max bettery capacity | 26AH | 52AH | 140AH |

| | XRC$^{G5}$ 6895 |
|---|---|
| Dimensions | 24" wide x 30" high x 13.5" deep<br>609.6mm x 762mm x 342.9mm |
| Approx weight | 60lbs / 27.2kg |
| Max I/O modules | 22 |
| Eused power terminals | 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 |

## Custody transfer applications

- Monitors user limits for detection, and reporting of abnormal conditions
- Defaults to 40 days of hourly data 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, AGA3-2012/2103, 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, GERG 2008, 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
- 100 Ohm platinum RTD resistance curve fit with user programmable single point offset or 3/5 point user calibration for RTD input
- 100 Ohm platinum RTD

**Control and Automation applications**

- Advanced embedded data logger (trending)
- Programmable alarm filtering
- Exception reporting capability
- Multiple protocol options including Totalflow packet protocol, various Modbus protocols 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
- PIO controller
- Plunger lift control
- Gas lift control
- Advanced embedded data logger (trending)
- Programmable alarm filtering
- AGA3, AGA7 and API Liquid measurement applications have the option to enable an "Enhanced" mode. This feature is designed to meet the BLM requirements as well as the option for the gas analysis to be logged in the standard Quantity Transaction Records.

## General specifications

### Enclosure

Powder-coated aluminum; Type 3R

### Certification (hazardous location classification)

CSA C/US Class I, Div 2, Groups C&D T3 -40° F (-40°C) to + 140° F ( +60°C)
ATEX: Sira 10AT EX4138X, II 3G Ex nAc IIB Gc T3 Ta= -40°C to +60°C (European Union Directive 2014/34/EU)
IEC Ex CSA09.0013X, Ex nAc 11B GcT3 (-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

**Emissions - European Regions**
EN61326-I:2012 Class B Emissions (Radiated & Conducted)

**Emissions - North America regions**
CFR 47, Part 15, Subpart B, Class B, FCC Emissions
ICES-003 Issue 4 CAN/CSA-CEI/IEC CISPR 11:2016, Class B ITE Emissions
AS/NZS CISPR 11-2016 (Australia/New Zealand)

**Immunity: European regions**
EN61326-1:2012 Electrical Control Equipment
EN61000-4-2 ESD: 2008 + 8 kV Air, + 4 kV Contact
EN61000-4-3:2005 RF Immunity, 10 V/m
EN61000-4-4 EFT: 2012, 2kV/1kV
EN61000-6-6:2013, Conducted Susceptibility, 3 Vrms
EN61000-4-8:2009, Power Frequency Magnetic Field 30 A/m

# XRC$^{G5}$ specifications

## Power

Nominal 12V DC battery

## Charger

Solar or 15 V DC, 30 W maximum

## Memory

Embedded Linux Operating System 256 MB of RAM
Persistent 64MB for storing configuration and flow data
Persistent 8GB flash storage for applications.

## Communications ports

1—dedicated – PCCU (local configuration port)
2—RS-232 or RS-485 (via board insertion modules) baud rates up to 115,200
1—USB 2.0 host port-optional
1—USB 2.0 device port (may be used as high-speed local configuration port) – optional
1—10/100 Base Ethernet port
1—Wireless access point (Wi-Fi)
1—On-Board Bluetooth

## LCD interface

Dedicated interface for 2 X 24 Liquid Crystal Display (LCD)

## Keypad interface

Dedicated interface for optional ABB supplied keypad

## I/O expansion

I²C bus Interface for TFIO modules

## Security switch

Dual-level security switch onboard

## Time base stability

± 7.5 ppm (parts per million)

## I/O scan rate

1 time per second (1 Hz)

## AGA-3/AGA-7/IS05167/VCone

Calculations are tested and verified to be within ± 50 parts per million as stated in API 14.3.4

## Analog inputs (onboard)

- 18 bit maximum resolution (0.00038%FS)
- 16 bit nominal resoiution (0.0015%FS)
- 5 single-ended channels
- Voltage mode: 0 to 10 V
- Current mode: 0 to 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 Ω
- Typical input impedance current mode: 249.3 Ω
- * For 4 -20 mA inputs; an external power source may be required if device requires more than 12 V DC

## Digital inputs/pulse inputs (onboard)

- 4 inputs configurable as active or passive with optional software de-bounce.
- Open circuit voltage V DC (internally pulled up to 5 V DC nominal)
- Short circuit leakage current:-395 uA typical
- Input capacitance: 0.1 µF typical
- Maximum allowable voltage range on input: - 0.5 V DC to 15 V DC
- 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 active voltage
- Minimum contact resistance to activate input: 1,000 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

## Digital outputs (onboard)

- 4 open channel FET transistor switches
- Open circuit voltage: 0 V DC
- Short circuit leakage current: 0 µA typical
- Output capacitance: 1,000 pF typical
- Maximum allowable voltage range on output: -0.5 V DC to 26.5 V DC
- Open drain FET type
- ‘ON’ resistance: 0.1 Ω typical (inciuding PTC fuse resistance)
- Maximum pulse current: 3A for 5 seconds
- Maximum continuous sink current: 2A

## Application/description chart

ABB's flow computers and RTUs come standard with numerous applications built in. We offer a "credit" system that allows users to choose which applications best suit their needs. Each unit comes with a standard number of credits and more credits can be purchased if necessary.

| | | No. of credits included with purchase | |
|---|---|---|---|
| | | 4 | 4 |
| **Application** | **Description** | **XFC$^{G5}$** | **XRC$^{G5}$** |
| **Operational applications** | | | |
| Analysis Trend File | Gas composition logs from online GC | $ | $ |
| Communications | Used to set up communication | – | – |
| Conversion Units | Converts units of measure | – | – |
| Coriolis Data Interface | Communication interface for Coriolis meter | – | – |
| Display | Controls data shown on LCD display | – | – |
| Enron Interface | Enron Modbus support of AGA3 and AGA7 | – | – |
| Holding Registers | General purpose data registers | – | – |
| I/O Interface | Scans all I/O data, onboard and TFIO modules | – | – |
| Level Master Interface | Interface to the Level Master product | – | – |
| NGC Client | TCP/IP Modbus interface to NGC | – | – |
| Operations | Configurable math and logic functions | – | – |
| Protocol Multiplexer | Interfaces two host systems to one communications channel | $ | $ |
| Pulse Accumulator | Scales and accumulates pulse inputs for basic volume totals | – | – |
| RAMS (Alarm) System | Configurable alarm detection, logging, and reporting | – | – |
| Therms Master | Gathers and sends gas analysis data via Modbus to Slaves | – | – |
| Therms Slave | Receives gas analysis data from EFM with Therms Master | – | – |
| Trend System | Configurable trending functionality | – | – |
| WLIO Interface | Interface to the WellTell wireless products | – | – |
| XMV Interface | Communications interface for an external multivariable | – | – |
| **Automation applications** | | | |
| Gas Lift | Artificial lift for wells with liquid loading problems | $ | $ |
| IEC Interface | IsaGraf Custom Logic | $† | $† |
| Pad Controller | Allows control of multiple wells | $ | $ |
| PID Control | Allows the use of PID controllers | – | – |
| Plunger Lift | Allows control of a plunger on a production well | $ | $ |
| Pump Control Interface | Prebulit interfaces for various pumps | $ | $ |
| Shutdown System | Shutdown a well or site | – | – |
| Valve Control (AO/DO) | Allows control of flow / pressure using Valve Control Module | – | – |
| **Measurement applications** | | | |
| AGA3 | Orifice gas measurement | $ | $ |
| AGA7 | Linear gas measurement | $ | $ |
| Coriolis Measurement | Coriolis gas flow measurement | $ | $ |
| Liquid Measurement | Linear liquid (API) measurement | $ | $ |
| NIST 14 Gas | CO2 measurement | $† | $† |
| NIST 14 Liquid | CO2 measurement | $† | $† |
| Nozzle Measurement | Flow nozzle gas and water measurement | $ | $ |
| Oil Transfer Measurement | Creates truck load ticket from tanks | $ | $ |
| VCone | VCone gas flow measurement | $ | $ |
| Wedge Gas | Wedge gas flow measurement | $ | $ |

– = included in purchase
$ = credit required
† = IEC credit

## Comparison chart

| Description | XFC$^{G4}$ | XFC$^{G5}$ Backward compatible | XRC$^{G4}$ | XRC$^{G5}$ Backward compatible |
|---|---|---|---|---|
| Integrated sensor | Yes | Yes | No | No |
| AI | 2 | 2 | 5 | 5 |
| DI | 2 (DI or PI) | 2 (DI or PI) | 4 (DI or PI) | 4 (DI or PI) |
| DO | 2 | 2 | 4 | 4 |
| Extended PI Option | - | 2 (5 V DC threshold) | - | 4 (5 V DC threshold) |
| TFIO | Yes | Yes | Yes | Yes |
| Processor | ARM920T, 32-bit | AM3358 ARM CortexA8 | ARM920T, 32-bit | AM3358 ARM CortexA8 |
| CPU | 203Mhz | 399Mhz | 203Mhz | 399 Mhz |
| Memory | | Programs/Applications/Data Storage = 16GB LPDDR RAM Program execution = 256 MB | | Programs/Applications/Data Storage = 16GB LPDDR RAM Program execution = 256 MB |
| Memory backup | Lithium backup | Solid state persistent storage | Lithium backup | Solid state persistent storage |
| Operating system | Windows CE | Linux | Windows CE | Linux |
| Lithium battery functionality | Runs real time clock and backup memory | Real time clock only (losing lithium battery will not execute a cold boot). Note 1 | Runs real time clock and backup memory | Real time clock only (losing lithium battery will not execute a cold boot). Note 1 |
| Additional real-time clock backup | No | Yes | No | Yes |
| Onboard serial-com ports | 2 | 2 | 2 | 2 |
| USB host/device | 1-host 1-device | 1-host 1-device | 1-host 1-device | 1-host 1-device |
| Local-serial PCCU | 1-serial port | 1-serial port | 1-serial port | 1-serial port |
| Ethernet port | 1-10 base-T Half duplex | 1-10/100 Base-T Full Duplex | 1-10 Base-T Half Duplex | 1-10/100 Base-T Full Duplex |
| WiFi & Bluetooth | N/A | Yes (Access Point) Note 3 | N/A | Yes (Access Point) Note 3 |
| Wiring PINOUTs | - | Same as G4 | - | Same as G4 |
| Engine card | Yes | No engine card | Yes | No engine card |
| New cold-boot | No | Yes. See note 1 | No | Yes. See note 1 |
| Application limitations | - | Yes. See note 2 | - | Yes. See note 2 |

Notes:

1. The lithium battery maintains operation of the real time clock. The lithium battery backup jumper (JI) is located near the Lithium Battery slot. The real time clock will continue to operate for 24-36 hours under typical conditions in case the lithium battery stops working. After this time, the unit will not cool-boot, and it will keep the last good known time and date.
2. Limiting number of applications (XSeries$^{G5}$ up to 100 Applications running at the same time)
3. The XFC and XRC support Wi-Fi Access Point (AP) functionality. This allows wireless local access for clients with Wi-Fi wireless capabilities. SSID broadcasting and separate logging and IP/Subnet from the Ethernet Port. The XFC and XRC support Bluetooth functionality to allow wireless local access. This procedure enables onboard Bluetooth. Independent name and passcode from other remote connection if require.

## Notes

Sales

Service

Software

## Notes

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