Process Solutions

Honeywell

RTU2020 Remote Terminal Unit

The Honeywell RTU2020 Remote Terminal Unit (RTU) is a modular, powerful and scalable controller capable of all remote automation & control applications. When combined with Experion® PKS and its radically simplified SCADA configuration with superior operator experience, it solves the most challenging remote automation requirements for the Oil & Gas industry.

Figure 1 RTU2020 with Onboard I/O

With our modern RTU2020 Remote Terminal Unit, you have perfect, 20/20 vision to realize the production potential of your Oil & Gas assets through safe, reliable and efficient remote monitoring, diagnosis and asset management, while ensuring low total cost of ownership.

Key Features

- Stand-alone Lowest power consumption in its category at a typical 1.8W

- Temperature range -40 to 75°C (-40 to 167°F).Up to 75°C, not 70°C like other units

- High reliability with well designed thermal paths

- HART enabled onboard I/O onboard. No extra hardware required. Digital HART data & diagnostics are available locally for use in RTU program & remote alarming

- HART IP allowing remote asset management of HART devices via Honeywell's Field Device Manager

- Efficient wiring & configuration saving installation and maintenance time

- Modern, powerful CPU for now & into the future

- Transient Suppression on every I/O channel & every communication

- A powerful IEC 61131-3 programming environment

- Liquids & Gas calculations in the same controller

- Flexible communication options for uplink & downlink

- Industry standard protocols of Modbus & DNP3 both as master and slave

- Secure Communications with authentication & encryption

- Data logging on board & optionally on local SD card

- Hazardous area certified to FM/CSA Class I Division 2 and ATEX Zone 2

The Lowest Power Consumption

Solar power is a common requirement in upstream applications to power RTUs. The more power consumed, the bigger the batteries and solar panels need to be. Both are expensive items, but the bigger they are, the bigger the infrastructure to hold them, all adding up to an expensive exercise, particularly in fields requiring hundreds of RTUs.

The good news is RTU2020 has one of the lowest power consumptions on the market at a typical tiny 1.8 Watts, even when using HART. When HART is required, other RTUs require additional hardware, consuming even more power, whereas RTU2020 has HART onboard.

The follow on effect of consuming less power is that there is less heat produced. This, coupled with an aluminium body and well designed thermal paths, means RTU2020 has less component stress which equates to higher reliability. Even in tropical and desert environments, either minimal or no cooling is required.

Endures Tough Environments

RTU2020 has been designed to withstand the toughest environments, with an operating temperature range of -40 to 75°C in humidity of 5% to 95%. Most other RTUs only go up to 70°C. RTU2020 has conformal coating to G3 and is hazardous area certified to FM/CSA Class I Division 2 and ATEX Zone 2.

RTUs are typically placed next to metal infrastructure such as pipelines, so to reduce risk of transient surges, every I/O channel and every communication port on RTU2020 has transient suppression.

High Performance RTU with HART enabled Onboard I/O

With a modern dual core 667MHz processor, RTU2020 has the power for today's applications and spare reserve to meet tomorrow's needs. RTU2020 comes with 28 onboard I/O in this mix:

Analog Inputs:	8	HART COMMUNICATION FOUNDATION
Analog Outputs:	2	HART COMMUNICATION FOUNDATION
Digital Inputs:	10	
Digital Outputs:	6	
Pulse Inputs:	2	

Importantly, by having built in HART, RTU2020 has no requirement for separate expensive and power consuming HART I/O modules or third party components.

The RTU comes with a dual I/O Link port ready to attach expansion I/O modules, including those coming available in the future.

The Value of HART

Upstream production fields require crews of field operators that travel each day over long distances and dangerous terrain. RTU2020 can help bring that requirement to an end. It is not only a large operating expense, but is also unsafe —and that is just the trip to site. The traditional RTU strengths of data logging and good sub-system communications with local devices,

alongside the newer functionality of smart device integration with HART, is enabling better fault modeling, both direct on the RTUs and at central locations. This means that each Field Operator is much more productive and can manage many times more wells than without the implementation of RTU2020.
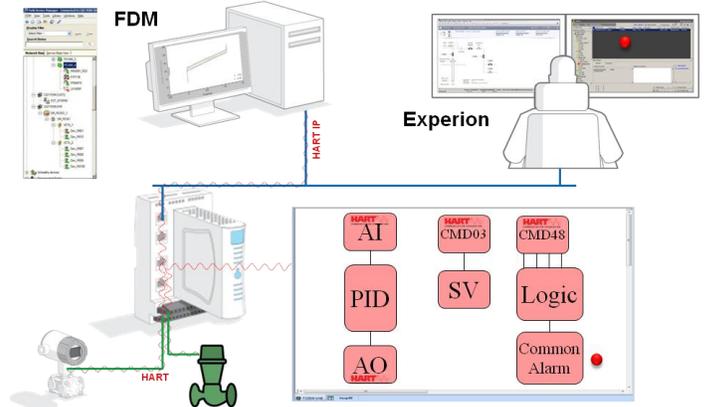

Figure 2, HART data accessed by RTU & remotely

In figure 2, we show RTU2020 accessing both the HART device's digitally accurate secondary variable and its diagnostic data. After receiving a common alarm from the RTU, the operator might go to a dynamically scanned detail page to diagnose the fault further or optionally use Honeywell's Field Device Manager to connect through to the HART device using HART IP.

For more information on smart device management, refer to the Field Device Manager (FDM) PIN.

Efficient Wiring and Assembly

Wiring built-in terminals can be a frustrating and error prone exercise for an installer. To combat this, RTU2020 comes with removable field terminals allowing the installer to hold the terminals in their hand for wiring even with gloves on. In addition, the terminals are printed with the I/O type and number giving the installer positive identification of the terminal against the ferrule label. Combined, this saves upfront installation cost and reduces wiring errors.
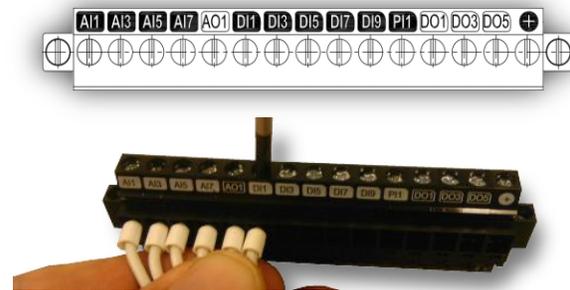

Figure 3, Positive identification on removable terminals

In the unlikely event that an RTU needs replacement onsite, the removable terminals significantly reduce the replacement time as there is no mass re-wiring. Simply unplug the terminal strips, remove and replace the RTU, then re-plug. RTU and production back-up in almost no time.

If just the processor needs replacement, then that is just as easy with two screws into the I/O termination assembly (IOTA) and hand grips on the processor cover to avoid slipping.

Figure 4, RTU2020 Processor ease of removal from IOTA

Flexible Communication Ports, Standard Protocols

Two features that really differentiate RTUs from PLCs are their communications capability and with that, data logging and history backfill. RTUs need to efficiently manage unreliable, low bandwidth networks. They need to communicate as a slave device to a remote SCADA system, usually over a redundant link which is on two different mediums; but also as a master to local subsystems like gas chromatographs and smart drives. In a "store and forward" type strategy, if communications to SCADA are interrupted, then the RTU needs to buffer data. Once communications is restored, then history is backfilled to SCADA.

RTU2020 covers all the scenarios by supporting SCADA protocols such as Modbus and DNP3 over:

- Two Ethernet ports
- Two RS-232 serial ports and
- Two RS-485 serial ports

Of course with DNP3, history recovery back to Experion is natively supported. To allow this backfill to be 'tuned' to the available network bandwidth, analog input deadbands can be adjusted remotely from Experion.

Robust Data Logging Ensures Data Availability

RTU2020 comes with data logging capabilities to record values to data files in flash memory or the onboard SD card, (optional), supporting up to a massive 32GB of data. This ensures important data is never lost and is available for future analysis.

The data files can be retrieved remotely through RTU Builder and then displayed or imported by many Windows applications. RTU2020 can log data continuously at a pre-defined interval, or data logging can be event-triggered.
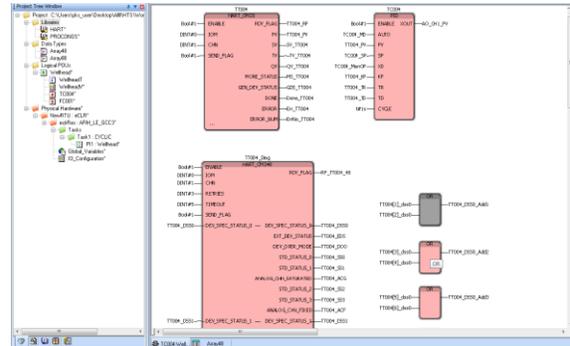

Figure 5, RTU Builder, an IEC 61131-3 Environment

RTU Builder —
Integrated Configuration Environment

RTU Builder is RTU2020's integrated configuration tool to design, configure, program and maintain your RTU investment. RTU Builder is fully compliant to IEC 61131-3 supporting all five programming languages.

- **Ladder Diagram** (LD)
- **Function Block Diagram** (FBD)
- **Structured Text** (ST)
- **Instruction List** (IL)
- **Sequential Function Chart** (SFC)

In addition to the basic function blocks that come with an IEC 61131-3 environment, RTU Builder includes Honeywell designed function blocks derived from our extensive industry experience and family of market leading automation controllers. Function blocks include PID, Device Control, Auto Manual, Fan Out, Ratio Control, Position Proportional, Totaliser and AGA gas and liquids calculations, just to name just a few. There are also RTU2020 specific function blocks such as HART Command 3, 'read dynamic variables' and HART Command 48, 'read diagnostics status'.

RTU Builder is designed to work locally or remotely to the RTUs using TCP/IP. Personnel can program on site or from a remote central location to save time and mitigate the need for site works.

Bulk Build Capability
RTU Builder enables efficient replication of RTU programs across many physical RTUs. Start with a common design and then roll that out across all similar equipment such as wellheads.

Remote Firmware Upgrades

Being able to remotely upgrade RTU firmware is very important when there are hundreds of RTUs geographically distributed. Increasingly, it is challenging to afford to travel to every RTU to conduct maintenance or upgrade to take advantage of new features. To account for low bandwidth, unreliable networks, remote firmware upgrading from RTU Builder is a two step process ensuring uptime of the RTU and reliability of the result.

Remote Diagnosis

Just as important as being able to remotely program and upgrade RTU2020 is being able to remotely diagnose the health of the RTU. RTU Builder provides a high definition analysis of the health scenario, leading to fewer site visits.
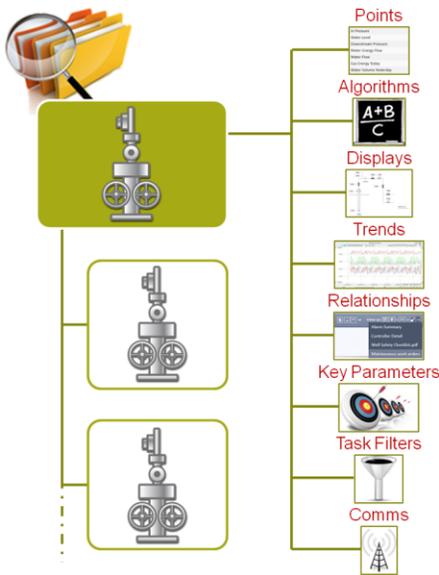

Figure 6, Experion Equipment Templates

Experion and RTU2020

Through use of open protocols, RTU2020 is designed to work with any SCADA system. When combined with Experion, it is the perfect solution — the 20/20 solution. With support for up to 5,000 RTUs per server and further server based expansion through the patented Distributed System Architecture (DSA), Experion is a highly scalable system with the highest level of reliability, safety and security.

Experion provides radically simplified SCADA configuration and superior operator and pipeline controller experience through the template based Equipment concept. Experion can be configured and operated by 'equipment' like a gas wellhead rather than merely points. When you match an Experion Equipment template with an RTU2020 replicated RTU, the cost of configuring the full solution is simplified ever further. Experion and RTU2020 have been designed for and are the 'perfect' matched solution for the oil and gas industry.
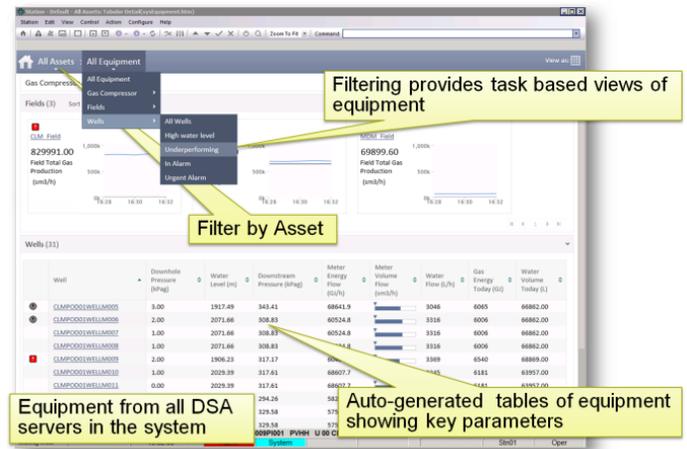

Figure 7, Experion Equipment Display

For more information, refer to the Experion SCADA PIN.

For More Information

Learn more about RTU2020 Remote Terminal Unit at our website www.honeywellprocess.com or contact your Honeywell account manager.

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