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GLOBAL RESOURCES

Foremost in Machine Performance for Life

MOBILE ELECTRONIC CONTROLS

Simplify the Complex

About GS Global Resources

GS Global Resources is the foremost machine performance resource trusted by OEMs who demand competitive advantage from every solution.

Performance Our integrated application solutions perform for the life of the machine, and for the lives of the people who touch it. At GS Global Resources, the leading engineering minds in hydraulic, electronic, mechanical and software applications simplify the complex. We use innovative, reliable technologies to speed solutions to market. And, whether reacting to market forces or changing markets altogether, GS Global Resources is essential to achieving total machine performance.

Profitability Our customers profit from continuous technology and innovation transfer through a single point of accountability. In other words, the engineer entrusted with your satisfaction is solely judged by your success.

Pragmatic Renowned as problem solvers by our customers, GS Global Resources delivers rare technical talent, value-driven inspiration and a pragmatic approach to winning in fiercely competitive markets. From system and component design to production and market support, GS Global Resources helps OEMs interpret, adapt and adopt technology.

Talent Most OEMs discover GS Global Resources through our customers, who also required more performance from their mobile and industrial machines. What they find is a team of dedicated, long- term, invested employees. Regardless of role, all of us are engaged in meaningful, satisfying careers designed to deliver customer efficiency, effectiveness and profitability throughout the value chain.

Confidence In fact, it's all about the talent and the execution. Our customers tell us they enjoy the confidence instilled by our hardworking, intelligent, respectful and thoughtful team. All GS Global Resources team members understand and commit to their role in delivering quality solutions where fluid power and electronic control converge. These include speed to market, improved safety, higher productivity, greater predictability and improved efficiency.

Value Because of our people and because of our relentless pursuit of ideas that matter, GS Global Resources customers recognize we deliver value like nobody else. Our talent, scalability and flexibility are beyond compare when it comes to understanding and overcoming challenges faced by OEMs. Frankly, it's why they have selected GS Global Resources for more than 40 years.

Commitment If OEMs find a comprehensive resource—where the complex simplifies, where peace of mind and mutual respect grow relationships, where competitive advantage and machine performance improve every time—there's only one place to get it. That's at GS Global Resources: *Foremost in machine performance for life*

GS GLOBAL RESOURCES
Foremost in Machine Performance for Life

Affiliations & Allied Manufacturers

Affiliations

AEM ASSOCIATION OF EQUIPMENT MANUFACTURERS

CENTER FOR COMPACT AND EFFICIENT FLUID POWER

THE FPDA MOTION & CONTROL NETWORK

PASCAL SOCIETY BRONZE MEMBER

Allied Manufacturers

APEM

CURTISS-WRIGHT

EATON Powering Business Worldwide

E-T-A ENGINEERING TECHNOLOGY

JORAL

MAGNETEK

maximatecc

OEM CONTROLS INC. CERTIFIED ISO 9001

OTTO Expect Excellence.

Parker

PROEMION Telematics Systems

SURE GRIP CONTROLS INC.

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GS GLOBAL RESOURCES Foremost in Machine Performance for Life

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To simplify your electronic control system design and specification process, we've assembled our product catalog systematically. We've also included select images to show case some of our engineered solutions. For more information about our innovative solutions and integrated products, please visit our website www.gsglobalresources.com.

GS GLOBAL RESOURCES
Foremost in Machine Performance for Life

Display Control Modules

GS Global Resources offers a wide selection of displays designed specifically for heavy-duty mobile and off-highway equipment. This allows machine operators to have a clear, continuous view of engine operation. Our displays use cutting-edge technology and provide the durability you need. We offer a combination of program and control options with easy-to-develop screen solutions.

J1939 Engine Monitoring Gauge Display – Model: MFD

A compact multifunction display featuring an electronic CAN-bus (SAE J1939) architecture. Designed for all-weather, the unit is configurable using stored parameters via intuitive menu control.

- **Screen Size:** 42 x 29 mm (viewing area)
- **Resolution**: 128 x 96 pixels
- **Screen Type:** LCD
- **Supply Voltage:** 12/24V nominal, 9-32Vdc range
- **Inputs:** 4 configurable digital or analog / 1 ignition / 1 battery
- **Outputs:** 1 high-side switch / 1 low-side switch
- **Operating Temperature:** -30°C to +85°C
- **Storage Temperature:** -55°C to +85°C
- **Environmental Protection:** IP66
- **CAN Communication:** CAN interface, SAE J1939 protocol

3.5 inch- Model: IQAN-MD3

A 3.5 inch master display unit that works with the expansion modules in the IQANdesign platform. The IQAN-MD3 is fully programmable for use in any machine applications, as a graphical user interface and as a CAN gateway.

A Master Controller and Display Capable Of Running Applications Created By IQANdesign

- **Screen Size**: 3.5 inches
- **Resolutions:** 320 x 240 pixels
- **Screen Type:** Transflective TFT color display
- **Supply Voltage**: 9-32Vdc
- **Inputs**: 7 analog / 7 digital
- **Outputs:** 1 digital
- **Operating Temperature:** −30°C to +60°C
- **Environmental Protection:** IP69K, outdoor use
- **CAN Communication:** CAN ICP, SAE J1939; CAN-Open

CAN Related Functions
This IQAN Master Unit Uses Three CAN-buses (CAN = Controller Area Network) To Communicate with IQAN Expansion Modules, Other Systems and Diagnostics

3.5 inch- Model: VI

A rugged, reliable and easily configurable full-color instrumentation display that is designed for the off-highway and industrial markets.

All-Weather Performance

- **Screen Size**: 3.5 inches, 24bit color depth
- **Resolution:** 320 x 240 pixels
- **Screen Type:** TFT with LED backlight
- **Supply Voltage:** 12/24 V nominal (9-32Vdc)
- **Inputs:** Configurable as voltage, resistive, frequency, switch-to-ground or switch-to-battery
- **Outputs:** 2x high-current, 1.25A, high-side switched outputs
- **Operating Temperature:** −40°C to +70°C
- **Environmental Protection:** IP66 EMC Conformity ISO 13766
- **CAN Communication:** CAN 2.0B channels J1939 or CAN-Open

Display Control Modules

Many of our displays are available with internal processing capabilities and act as a System Master Controller. A remote master control module can be used with an independent display to improve system integration configurations and machine options.

5 inch – Model: VC

A 5 inch full-color display with a powerful ARM CPU. The open software platform has a choice of tools for design of premium graphical user interfaces. This, together with WVGA resolution and high brightness display, enables fast design of sharp user interfaces.

•**Screen Size:** 5 inches
•**Resolution:** 800 x 480 pixels
•**Screen Type**: TFT with LED backlight, anti-glare coated
•**Touch Screen:** Optional
•**Supply Voltage:** 12 or 24Vdc
•**Inputs:** 2 configurable analog/digital, may be used for measuring resistance
•**Outputs:** 2 configurable high side for driving up to 1A, can be used for continuous driver or PWM output
•**Operating Temperature**: −40°C to +70°C
•**Environmental Protection:** IP66
•**CAN Communication:** 2 x CAN, ISO 11898, 2.0B, Bit-rate configurable 20-250 kbps
•**Ethernet**: 1 x Ethernet

Freely Programmable Multifunctional

Display Computer with Multifunctional Capability, Can Be Used As Instrumentation Display, Machine Control HMI, Video Monitor, Electronic Manual and More

7 inch – Model: XA

A full 7 inch full-color touch screen display computer with a powerful ARM CPU and a robust aluminum enclosure to endure the most challenging operating environments. The open software platform has a choice of tools for design of premium graphical user interfaces. This, together with WVGA resolution and a high brightness display, enables fast design of sharp user interfaces.

•**Screen Size:** 7 inches
•**Resolution:** 800 x 400 pixels
•**Screen Type:** Color TFT with LED backlight
•**Touch Screen:** Capacitive or resistive touch screen
•**Supply Voltage**: 12 or 24Vdc nominal
•**Inputs:** 4 digital configurable in or out
•**Outputs:** See above
•**Operating Temperature:** -25°C to +70°C
•**Environmental Protection:** IP65
•**CAN Communication:** 2x CAN-J1939, CAN-Open 2.0B-20-250KBPS, 1 MBPS optional
•**Ethernet:** 1 x 10/100 Base-T

XA All-integrated used as telematics unit, enabling access of vehicle data online.

PCAP Touch Screen, (Swipe Feature)

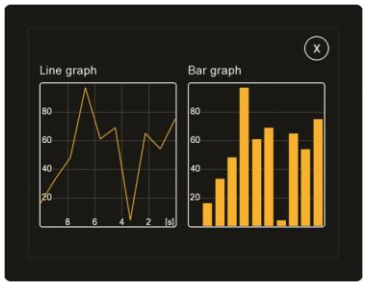
Readability in Direct Sunlight - Open Software Application GSM/GPRS

Display Control Modules

5.7 inches, 7 inches or 10.1 inches – Model: MD4

The IQAN-MD4 is a family of master display units, fully compliant with the IQAN design platform system. Available in 5.7 inch, 7 inch or10.1 inch screen sizes, the IQAN-MD4 is fully programmable for use in any machine application as a master controller. The IQAN-MD4 have a rugged mechanical design with no moving parts, and are completely sealed and are weather proof for outdoor use.

•**Screen Size:** 5.7 inches, 7 inches or 10.1 inches
•**Resolution:** 5.7" 4:3, 640 x 480 pixels, 7" 16:9, 800 x 480 pixels, 10.1" 4:3, 800 x 600 pixels
•**Screen Type**: Color TFT, LED backlight
•**Touch Screen:** PCAP depending on configuration
IQAN-MD4-5 - 5.7 inches (14 cm) with optional touch screen
IQAN-MD4-7 - 7 inches (18 cm) with touch screen
IQAN-MD4-10 - 10.1 inches (26 cm) with touch screen
•**Supply Voltage:** 9-32Vdc
•**Inputs:** 2 voltage / 10 digital / 1 encoder
•**Outputs:** 4 digital
•**Operating Temperature:** −30°C to + 70°C
•**Environmental Protection:** IP65, IP6K9K
•**CAN Communication:** 4 CAN (ISO 11898)
•**Ethernet:** 100Base-Tx



IQAN-MD4 Master Display Unit, Programmable For Use in Any Machine Application as a Master Controller

Property Inspector - Line Graph control

Property	Value
Name	Engine oil pressure
Description	
Visible	Yes
Top	113
Left	22
Width	280
Height	300
Type	Scroll
Show background	Yes
Background color	Black
Input channel	Engine oil pressure [Kpa] - J1939 param
Last index	
X Axis	{Yes; 4; 10}
Show labels	Yes
Tick mark count	4
Time depth [s]	10
Y Axis	{Yes; 4; 0; 100}
Show labels	Yes
Tick mark count	4
Min value	0
Max value	100
Graph color	Custom: $FF1DB9FF
Grid color	Custom: $FF55606A

7 inches – Model: VA

CCpilot VA is a 7 inch full-color display computer with a powerful ARM CPU. The open software platform has a choice of tools for design of premium graphical user interfaces. This, together with WVGA resolution and high brightness display, enables fast design of sharp user interfaces with high usability.

•**Screen Size**: 7 inches
•**Resolution**: 800 x 480 pixels
•**Screen Type:** TFT with LED backlight
•**Touch Screen:** 10 configurable soft keys, intuitive interactive system with touch screen
•**Supply Voltage**: 12 or 24Vdc nominal voltage. Voltage range 9-32Vdc CPU and communication operational down to 6.0Vdc
•**Inputs:** 8 configurable inputs for analog/digital sensors. May be used for measuring resistance/4-20mA/frequency/digital/analog signals
•**Outputs**: 2 configurable high side outputs for driving up to 1A. May be used for continuous driver or PWM output
•**Operating Temperature**: −25°C to + 70°C
•**Environmental Protection:** IP66
•**CAN Communication:** 2 x CAN physical layer ISO11898 2.0B and J1939-11. Bitrate configurable 20 kbps – 1 Mbps
•**Ethernet:** 1 x Ethernet, 10/100 Base-T

Optional All-Glass PCAP Touch Screen and Configurable Soft Keys, Operators Are Offered An Intuitive Interaction With The System

Multifunctional Capability Can Be Used As Instrumentation Display, Machine Control HMI, Video Monitor, Electronic Manual and More

Display Control Modules

Putting humans in control of vehicles in critical environments with Operator Interface

10 inches or 12.1 inches – Model: XM2

The Ccpilot XM2 is a 10" and 12.1" PC-based touch screen display computer for creating advanced HMI systems where process controls, video monitoring and other operator support functionalities are integrated.

PC-based Touch Screen Display

•**Screen Size:** 10 inches or 12.1 inches
•**Resolution:** XGA 1024 x 768, 2, 3D, vector graphics
•**Screen Type:** TFT with LED backlight
•**Touch Screen:** Resistive
•**Supply Voltage:** 12 or 24Vdc nominal voltage. Voltage range 10-34Vdc CPU and communication operational down to 6.0Vdc
•**Inputs:** 4 x Digital In, pull-up, 4 x analog video in
•**Outputs:** Stereo line out, line in, mic in
•**Operating Temperature**: −25°C to +70°C
•**Environmental Protection:** IP65
•**CAN Communication:** 4 x CAN, physical layer ISO 18898
•**Ethernet:** 2 x Ethernet, 10/100 Base-T

Intel Atom E3826, Dual Core 1.46 GHz Main Central Processing Unit (CPU)

12.1 inches – Model: XL

The Ccpilot XL is a 12 inch PC-based touch screen display computer with Intel i7 core and Win7 image for efficient deployment of advanced HMI systems and applications.

•**Screen Size:** 12.1"
•**Resolution:** 1024 x 768 pixels
•**Screen Type:** TFT with LED backlight
•**Touch Screen:** Resistive. Option to replace touch screen with anti-reflex treated glass cover lens
•**Supply Voltage: 12 or** 24Vdc nominal
•**Operating Temperature**: −25°C to +55°C
•**Environmental Protection:** IP54
•**CAN Communication:** 2 x CAN, ISO 11898, 2.0B, Bit-rate configurable 20-250kbps. (1Mbit optional)
•**Ethernet:** 1 x Ethernet, 10/100 Base-T

Runs Watchdog Functions Controlling Integrity of Product, for Increased Reliability and Safety

Mining, underground drill rigs, the XL used as main man machine interface.

Display Control Modules

Integrated touch screen display computer. The open software application for GUI, controls, diagnostics and mobile connectivity enables easy realization of HMI systems.

10.4 inches, 12.1inches – Model: XS

The Ccpilot XS is a 10" and 12" full-color touch screen display computer with a powerful ARM CPU and a robust aluminum enclosure to endure the most challenging operating environments. The open software platform has a choice of tools for design of premium graphical user interfaces. This, together with XGA resolution, enables fast design of sharp user interfaces. CCpilot XA has multifunctional capability and can be used as instrumentation display, machine control HMI, video monitor, Electronic manual and more. It also features optional built-in wireless interfaces like WLAN, GPRS and Bluetooth.

- **Screen Size:** 10.4 inches, 12.1 inches
- **Resolution:** 1024 x 768 pixels
- **Screen Type:** TFT
- **Touch Screen:** Projective capacitive or resistive 5-wire
- **Supply Voltage**: 12 or 24Vdc nominal
- **Operating Temperature:** −25°C to +70°C
- **Environmental Protection:** IP65
- **CAN Communication:** CAN, ISO 11898 2.0B, Bit-rate configurable 20-250 kbps. (1Mbit optional)
- **Ethernet:** 10/100 Base-T

4 x Analog Video in, NTSC or PAL

Linux, Windows Embedded Compact

10.4 inches, 12 inches, 15 inches - Model: XM

Ccpilot XM is a 10" and 12" PC-based touch screen display computer for creating advanced HMI systems where controls, video, operator support and asset management functionalities are integrated. The open software application platform for GUI, controls, diagnostics and mobile connectivity enable easy realization of these HMI systems.

- **Screen Size**: 10.4 inches, 12 inches, 15 inches
- **Resolution:** XGA 1024 x 768 pixels
- **Screen Type:** TFT with LED backlight
- **Touch Screen:** Resistive
- **Supply Voltage:** 12 or 24Vdc nominal
- **Operating Temperature:** −25°C to +70°C
- **Environmental Protection:** IP65
- **CAN Communication**: 4 x CAN, ISO 11898 2.0B, Bit-rate configurable
- 25-250 kbps. (1Mbit optional)
- **Ethernet:** 2x Ethernet 10/100 Base-T

Wilan, GSM/GPRS, Bluetooth, GPS

PC-based platform supporting both Windows and Linux

XM used as main man machine interface on hydraulic shovels.

Controllers – CAN Modules

Expand the capabilities of your vehicle control system with a wide range of programmable CAN based I/O Expansion Modules. Every electronic device on a vehicle has different I/O requirements. A CAN environment simplifies machine wiring and allows - the - original equipment manufacturer flexibility in machine design and development.

Master Control Units, IQANdesign Platform

Model: IQAN-MC2 Master Controller

A flexible master unit for the IQANdesign platform, this unit is suitable for use as either a CAN-bus master or stand-alone controller. The IQAN-MC2 features I/O and system flexibility that allows the user greater freedom to define signals and system layout for both measurement and control. The 32 bit architecture provides computational capacity that allows it to perform high speed (ex. 5 ms) control loops for time critical functions.

- **Supply Voltage:** 9-32Vdc
- **Inputs:** 5 multipurpose
- **Outputs:** 8 dual proportional
- **Operating Temperature:** -40°C to +70°C
- **Environmental Protection:** IP69K
- **CAN Communication:** 2xCAN, 1xUSB

Real Time Clock
Can Perform Data Logging Functions

Model: IQAN-MC3 SIL2 Master Controller

The IQAN-MC3 is a SIL2 rated master module in the IQANdesign platform. It can be used as a stand-alone controller, as a single CAN-bus master, or together with other IQAN master modules. This unit is especially suited for applications with higher demands on functional safety, where there is a need to prove safety integrity of each implemented safety function.

Programmable Hydraulic Controller

- **Supply Voltage:** 9-32Vdc
- **Inputs:** 32 Total 16 voltage / 8 frequency / 8 digital
- **Outputs:** 9 Total 4 proportional / 5 digital
- **Operating Temperature:** -40°C to +85°C
- **Environmental Protection:** IP69K
- **CAN Communication:** 4XCAN

Very Robust to Vibration

Handles Cycling of Moisture and Temperature Well

Model: IQAN-XS2/XA2 Expansion Controller Module

The IQAN-Xs2 is an IQANdesign platform expansion module that is a flexible, digital signal I/O module to be used as an expansion unit in an IQAN control system. This unit is designed for high digital I/O, weather resistance and safety.

- **Supply Voltage:** 9-32Vdc
- **Inputs:** 8 Total 8 voltage / 8 digital
- **Outputs:** 12 Total on/off
- **Operating Temperature:** −40°C to +70°C
- **Environmental Protection:** IP66
- **CAN Communication:** (2) CAN (ISO 11898) ICP, SAE J1939, Generic CAN

A Large Number of Inputs and Outputs Allowing the User to Have Fewer Modules for Digital Signals

Model: XA2 Expansion Controller Module

- **Inputs:** 12 Total 8 voltage / 4 frequency / 8 digital
- **Outputs:** 12 Total 6 on/off / 6 double proportional

Controllers – CAN Modules

Model: IQAN-XC10

The IQAN-XC10 module has a large number of digital inputs for connection to switches. It has analog inputs for connection to analog sensors with resistive or hall effect sensors. A "total systems solution" that allows the original equipment manufacturer to reduce cost while increasing flexibility in design and improve diagnostic capability.

•**Supply Voltage:** 7.5-32Vdc
•**Inputs:** 30 Total 10 voltage / 4 frequency / 16 digital
•**Outputs:** 20 Total 16 digital out high / 4 digital out low
•**Operating Temperature:** -40°C to +85°C
•**Environmental Protection:** IP66
•**CAN Communication:** (2) CAN (ISO 11898) ICP, SAE J1939, Generic CAN

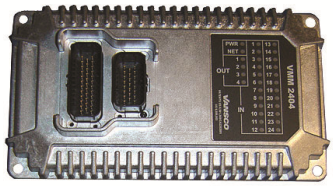
This Unit is Designed to Get a High I/O Count in One Module

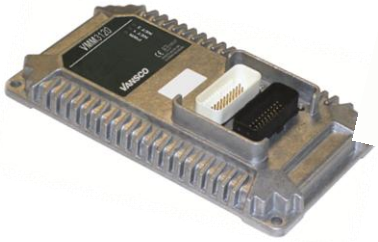
Frequency Inputs for Active Sensors, Such As Hall Effect Speed Sensors

Vansco Multiplexing Modules

Vansco multiplexing modules are controllers that can be used alone or with other VMM modules in a control system. Programmable controllers for vehicles and other applications, featuring a ladder-logic based programming tool that allows users to define the logic as well as perform real-time diagnostics, communicating using J1939 protocol over a CAN-bus connection.

•**Supply Voltage**: 7-32Vdc
•**Inputs & Outputs**: See below
•**Operating, ambient:** -40°C to + 85°C
•**Environmental Protection:** IP66
•**CAN Communication:** SAE J1939

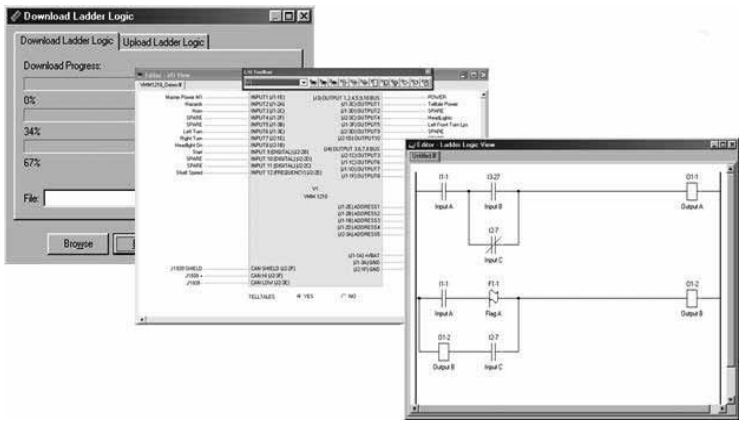




Model:	Inputs:	Outputs:
VMM0604	6 Total	8 Total
VMM1210	12 Total	10 Total
VMM1615	16 Total	15 Total
VMM2404	24 Total	8 Total
VMM3120	31 Total	20 Total

VMMS

VMMS is a ladder-logic based programming tool that allows users to define the logic for their VMM system as well as perform real-time diagnostics.



Creative: Provides full access to create and edit ladder logic applications.
Productive: Has advanced diagnostics, log access, I/O forcing, viewing, printing and upload/download capabilities.
Active: Has basic diagnostics, viewing and upload/download capabilities.

Controllers – CAN Modules

Model: mVEC Load Power Distribution Module - Multiplexed Vehicle Electrical Center

The Multiplexed Vehicle Electrical Center (mVEC) offers economical J1939 control for high power circuits in vehicle power distribution. Based on proven and patented technology and is suited for the most demanding transportation vehicle applications. The mVEC can be configured to provide various original equipment manufacturer circuit protection and switching functions.

•**Capacity:** 200 Amps max rating 20 Amps per output pin Max of12 relays and/or 32 fuses, or various combinations, (unique design configurations may be required)
•**Input:** Studded input option: supports two M8 input power studs for DC power into the VEC power grid
•**Output:** Individual outputs rated up to 30A,
• maximum of 32 outputs possible
•**Rating:** Operating temperature ratings: −40°C to +85°C
•**Environmental Protection:** IP66

Model: 15300 Rear Terminal Mini Fuse and Relay (RTMR)

The 15300 RTMR provides efficient power distribution in a rugged compact form for applications in marine, construction, agriculture, and heavy trucking and specialty vehicles. The 15300 RTMR is available with various degrees of internal electrical bussing. Additionally custom labels and multiple hardware configurations are available to solve any application need.

•**Input Terminal Rating:** M6 input studs on bussed/partially bussed inputs: 80A max input on bussed fuse side, 80A max input on bussed relay side.
•**Output Terminal Rating:** 2.8mm blade terminals (30A max per terminal)
•**Temperature Rating:** -40°C (-40°F) to 125°C (260°F) (rating on PDM only)
•**Termination:** Delphi Packard Metric-Pack® 280 Series terminals sealed/tangless).* Delphi Packard 280 Series cavity plugs are installed where wires are not used.* Accepts #12-22 AWG wire sizes

Stackable, Flexible Expansion I/O Module

Model: IQAN-XC21/XC22/XC23

The IQAN-XC21/XC22/XC23 expansion modules are a subset of the collection of expansion/slave controllers that can be added to an IQAN system. The IQAN expansion modules communicate with an IQAN master display or master controller over a CAN bus. Each type of module has addressing in the wiring harness through use of an ID tag; the addressing of the IQAN-XC21/XC22/XC23 allows up to 8 modules of each type on the bus. The housing is designed for stacking multiple modules, providing a high density of I/O in a small footprint.

IQAN-XC21 and XC23 have up to 20 digital inputs for connection to switches. Up to 8 of these inputs may be configured as voltage inputs for connection of 0-5Vdc signals from resistive or Hall-effect sensors and joysticks. The sensors can be powered from one of the 5Vdc reference voltages on the module. The remaining 12 inputs can be configured as up to 10 frequency inputs and 1 encoder input for measuring speed and position.

The IQAN-XC22 has up to 12 digital inputs for connection to switches. These inputs can be configured as up to 10 frequency inputs and 1 encoder input for measuring speed and position.

•**Supply Voltage:** 9-32Vdc
•**Inputs:** 20, 12
•**Outputs:** 8
•**Operating Temperature:** -30°C to +70°C
•**Environmental Protection:** IP32 (In cab use)
•**CAN Communication:** Parker ICP

Controllers – CAN Modules

Model: XI02 Cinch SE
This module is designed specifically for off-highway applications where rugged controls and long life are an absolute requirement. Designed as a CAN-bus I/O module for applications that require multiple analog and digital inputs, as well as digital outputs.

•**Supply Voltage:** 9Vdc to 32Vdc (reverse polarity protection)
•**Inputs:** 24 Total 12 digital / 12 analog
•**Outputs:** 8 Total 8 digital
•**Operating Temperature:** -40°C to +80°
•**Environmental Protection:** IP67
•**CAN Communication:** J1939 250kBytes

Model: XI02 Hourglass
Same features as Cinch SE, but this in cab version module is installed in a potted enclosure. The design utilizes cost effective Molex connections to allow for extreme flexibility of the hardness solution requirements.

•**Inputs:** 24 Total 12 digital / 12 analog/digital
•**Environmental Protection:** IP55 Utilized-in-cab, all electrical potted, IP rating specified by Molex connector solution

Model: Master Hydraulic Controller (MHC)
The MHC (Master Hydraulic Controller) is a stand-alone controller or an expansion control board which can control all aspects of machine control. The MHC controller is a very cost effective module which has CAN J1939. The MHC controller is excellent for proportional hydraulic valve control. The display allows for a diagnostic and machine set up.

•**Supply Voltage:** 9-36Vdc
•**Inputs:** 6 Total 6 digital / 6 analog
•**Outputs:** 16 high-side PWM digital
•**Environmental Protection:** IP66 (housing), fully sealed for harsh environments
•**Operating Temperature:** -40°C to +85°C
•**CAN Communication**: (2) CAN /J1939 ports

Model: XI03
The XI03 is a CAN-bus I/O module for applications that require additional inputs and outputs. The standard software allows for easy integration into any control system with CAN /J1939 messaging control. The IX03 can work as a stand-alone controller for specific applications with limited I/O requirements.

•**Supply Voltage:** 11-32Vdc
•**Inputs:** 10 Total 4 analog / 6 frequency/digital
•**Outputs:** 6 Total 4 analog / 6 frequency/digital
•**Operating Temperature**: −40°C to +70C
•**Environmental Protection:** IP67
•**CAN Communication:** (1) SAE J1939 CAN

Very Cost Effective For Existing Control Systems

Switch Panels

Smart Vehicle Control System Solutions

Designed and Manufactured To Make Life Simpler, the Job Safer, and Your Machine More Efficient

Advantages:
- Scalable
- Configurable
- Integrates with existing control systems
- CAN programmability & flexibility
  - J1939/RS485
  - CAN-Open
  - ISO 11783

Customer Defined

Options:
- Pushbutton
- Electronic
- Toggle
- Rocker
- Joysticks

Incorporating Function:
- LED illumination
- Backlighting
- Intensity levels
- Sealing
- Connection

360° Gold PCB Contact Plating

6 Position under Plate Mount with Arm Rest and/or Dash Mount

- Can be used for left or right arm pod assemblies
- Designed to be utilized as an under plate mount
- High intensity LED backlights can be customer specific
- In Cab Systems for arm rest and/or dash assemblies
- Panel buttons have multicolored options
- Quick and easy fingertip control
- Silicone buttons have etched and sealed labels set to customer specifications]
- Six position CAN switch panel

Control Systems Utilizing the Measured Load on Outriggers to Determine the Stability and Safety of the Vehicle

Focusing on End User Preferences and New Technologies
- Increased ergonomics
- Streamlined designs
- Enhanced operator visibility and awareness

GLOBAL RESOURCES
Foremost in Machine Performance for Life

Switch Panels

Commercial Vehicle Control Solutions with Eaton's solid performance vehicle and commercial controls for global applications. These include everything from electromechanical pushbutton rocker and toggle designs, to electronic rocker, indicator and display devices, all of which are customizable.

Rocker Switches Series: NGR

The field-proven NGR offers both European styling and ergonomic design while providing the solid durability that you have come to expect from Eaton switches. Illuminated and non-illuminated versions with either incandescent bulbs or LEDs are available in a variety of popular switching circuits. The NGR also offers a variety of rocker buttons and indicators with laser-etched or pad-printed icons, insertable lenses and adhesive-backed labels.

The Rocker Is Replaceable and Snaps On and Off the Switch

- **Standard Switch:** Provides splash and dust resistance to IP42, while the sealed version is sealed to IP67 when supplied with panel seal
- **Backlighting Technique:** Allows for the legend to appear daylight while or dead-front when non illuminated, but will change color when illuminated depending on the back-lit color chosen
- **Two Legend Areas:** On the ends of each rocker of sufficient size easily accommodate two lines of four Helvetica Narrow 12-point characters
- **Rocker Snaps:** On and off the switch, making it easily replaceable

Flexible Solutions for Severe Environments

A complete family of flexible CAN-based solutions for your applications

Keypad Electronic Switch Modules Series: E31

Offering an increased degree of sealing to IP68 from the front and rear of the module, the keypad electronic multiplex switch module (eSM E31) meets severe environment applications with exceptional operator feedback; tactile, audible and visual with up to four independent indicator LEDs.

Electronic Switch Modules Series: E32

Offering a high level of flexibility, the above-panel electronic multiplex switch module (eSM E32) covers your wide range of switch and indicator applications using standard or custom graphics, as well as a full range of circuits and illumination options.

Electronic Switch Modules Series: E33

Designed to support harsh environmental applications, the E33 eSM offers sealing to IP68 and offers additional features including guarded and locking rockers.

Electronic Switch Modules Series: E30

eSM E30 modules are designed to operate using at least one master module and any number from zero to seven expansion modules. The product is also complimentary to Eaton's existing NGR line of rocker switches that allows combining the advantages of electro-mechanical switches with multiplexed modules.

Electronic Vehicle Display Series: eVU

With a focus on communications, convenience and safety, the Electronic Vehicle Display (eVU) works in sync with existing onboard computers and networks to provide the driver with valuable information. Electronic Vehicle Displays (eVU) fill the gap between onboard systems and displays, function by function.

Switch Panels

Electronic Switch Modules and Vehicle Displays

Electronic Switch Modules (eSM) and the Electronic Vehicle Display (eVU) are custom ordered, application specific electronic communications products. Contact GS Global Resources to discuss your application needs with one of our specialists.





		E30 Series	E31 Series	E32 Series	E33 Series	eVU Series
	Truck	●		●		●
	Construction		●		●	
	Agricultural		●		●	
	On-road specialty vehicle	●	●	●	●	●
	Motor coach / bus	●		●	●	●
	Mining equipment		●		●	
	Emergency vehicles		●	●	●	●
	Material handling		●		●	

	E30 Series	E31 Series	E32 Series	E33 Series	eVU Series
Voltage	12V	9–32 Vdc	12V and 24V options	9–32 Vdc	9–32 Vdc
Master	SAE J1939 CAN 2.0b	SAE J1939 CAN 2.0b	SAE J1939 CAN 2.0b	SAE J1939 CAN 2.0b	SAE J1939 CAN 2.0b and SAE J1708
Expansion	Sub bus	Lin 2.0	Lin 2.0	Lin 2.0	N/A
Front	IP42	IP68	IP53	IP68	IP68 ❶
Rear	IP40	IP68	IP50	IP68	SAE J1455 4.7.3
Life cycle	250k	1M+	500k	Up to 1M	N/A
Late-point definition	Yes	Quick turn	Yes	Yes	N/A
Customizable	Yes	Yes	Yes	Yes	Yes

❶ Assumes panel sealing

Joysticks

GS Global Resources' design experience and proven product solutions help our customers customize the look and the feel of their machine. We have the ability to configure a combination of bases, handles, and controls to suit your application needs.

GS Global Resources Provides Original Equipment Manufacturers with Custom Human Machine Interface Solutions that Meet a Wide Variety of Applications Needs.

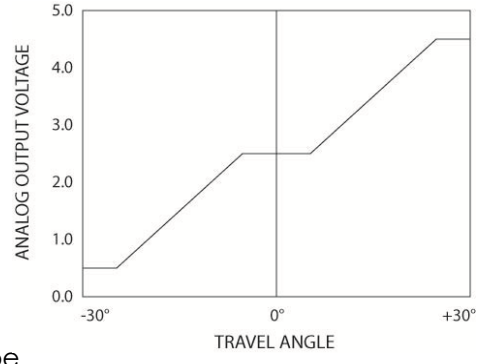
Features:
- Analog
- CAN (J1939 CAN-Open)
- Density: 1 Micro processor, 8 switches with up to 24 indicators
- Hall effect
- Indexing features
- Multifunction, and or multistate lights
- Rocker switch
- RS-485 Protocol
- Rubber button technology
- Sealed: 5 million cycles dome technology

Customization with:
- Custom contours
- Custom graphics
- Custom icons
- Custom molds

Flexible Design with Custom Control Joystick Solutions

Fully functional movement of machine
…with third rotational control axis, "z".

The Z-axis is available in spring-return to center or friction held in order to allow for fixed "z" rotation, even if the operator's hand is removed from the joystick.



The sensor is ratio metric from a 5Volt supply allowing the Z-Axis control to be fully operational on any machine. The ratio metric signal allows for continuous monitoring of the Z-Axis and error indication upon loss of signal or ground wires.

- **Controlling Range of Operating Level:** ± 30° from center
- **Operating Force:** 12 inch-oz. rotational torque
- **Maximum Torque at Stop:** 50 Ft. Lbs
- **Operating Temperature Range:** −40°C to +60°C
- **Shock:** 5 Gs
- **Life Expectancy:** Approximately 3 million cycles
- **Materials:** 6061-T6 anodized aluminum
- **Supply Voltage:** 5.0Vdc ± 0.1Vdc
- **Output (Ratiometric):** 0.5 – 4.5Vdc for −30°C to +30°C
- **Linearity:** ± 3%
- **Hysteresis:** ± / 0.5%

Proprietary and private-labeled solutions which allow our original equipment manufacturer customers to easily integrate GS Global Resources' control solutions into their manufacturing processes.

Dual Hall effect, non contacting sensing elements allow for exceptional life span. Redundant Hall effect sensors ensure reliability and safety in the harshest of environments.

Joysticks

GS Global Resources places the most important machine control functions at your fingertips for smooth and coordinated total machine control. We provide an assortment of rocker switches, proportional triggers, and push-button controls that offer a flexible design, a diverse selection of controls, and the ability to mix-and-match.

Tactile Feedback Thumper

Thumper

- Custom software, and graphics
- Dual Hall effect sensors, fully sealed
- Tactile Feedback "Thumper"
- Z-axis twist with up to ± 30°
Circular motion of the wrist

Multi-Axis

Digital Output Option Offers Switched Fingertip Control With Sequential Detent Feel

- Applications where compact size and functionality are important
- Controller with analogue output offers proportional fingertip control with up to three-axis

Single-Axis

Optional Neoprene Boot To Protect From Dust and Dirt Ingress. Sealed to IP66

- A minimum width, low profile joystick controller that provides smooth, precise fingertip control in one axis with a choice of two lever lengths
- For applications where ergonomics and system integrity are paramount

GS Global Resources joysticks' are designed with ergonomics in mind to ensure operators of light and heavy duty vehicles get the comfort they need without jeopardizing control. Our sealed joysticks are designed specifically for extreme environments with an array of possible configurations.

BASES

GS Global Resources has certified multiple joystick bases from several manufacturers with different electrical designs and mechanical capabilities, providing the X, Y and Z-axis motion of the joystick.

BASE CONTROLS

- CAN-J1939, CAN-Open
- Directional switches
- Hall effect – dual redundant
- Potentiometric
- (PWM) Pulse Width Modulation

MOTION CONTROL OPTIONS

- Friction detent
- Dual-axis CAN
- Dual-axis CAN-Open
- Dual-axis Hall effect
- Multiposition
- Optional gates
- Return lock
- Single-axis Hall effect
- Spring return to center
- Triple-axis

MECHANICAL/DURABILITY

- **Operating Life:** 10,000,000+ cycles
- **Environmental Protection:** IP65 to IP67
- **Operating Temperature:** -40°C to + 85°C

Connectors Are Dependent On the Joystick Base Selected

Available Features:

- Custom graphics
- Custom software
- Tactile feedback "thumper"
- Z-axis twist to ± 30°

GS GLOBAL RESOURCES
Foremost in Machine Performance for Life

Joysticks

FINGERTIP CONTROLS:

All handle controls can be wired and programmed into the CAN joystick base, resulting in a single CAN node.

Push Buttons, Toggles, Indicators, Triggers

HANDLES, GRIPS:

GS Global Resources designs and develops custom handles to meet specific customer needs. We understand that handles are the primary HMI, and we offer a wide variety of handle solutions.

BASES:

GS Global Resources has extensive experience in CAN programming to integrate the joystick with control systems. Joystick programming provides precise machine movement using function ramping with pulse width modulation and feedback.

Joystick control is the foundation of the machine's performance. Our joystick controls are designed and manufactured to be reliable in the harshest environments. We understand that not every application has the same needs. GS Global Resources strives to meet the particular requirements of each customer's needs by delivering a balanced joystick base that improves machine performance every time.

CUSTOMIZATION:

All handle controls can be wired and programmed into the CAN joystick base resulting in a single CAN node. Joystick programming provides precise machine movement using function ramping, pulse width modulation and feedback.

Joysticks

JC1500 Rugged Single-Axis Contactless Joystick Controller
The JC1500 features a spring-to-center or friction-hold lever action that utilizes contactless rotary position sensor technology, combined with a rugged, low profile design.

JC6000 Rugged Multi-Axis Joystick Controller
The JC60000 is a CAN-bus joystick controller that is designed for demanding operator control applications in off-highway vehicles and other human-machine interfaces (HMI), where strength, reliability and grip functionality are important.

JC8000 Rugged Multi-Axis Joystick Controller
The JC8000 offers an extremely rugged joystick solution, with a wide variety of grip options.

MG Customizable Multi-grip Handle
Universal "grip" handles that can be customized with combinations of potentiometers, rocker switches and push buttons.

GS Global Resources rugged handles are built to withstand exposure to harsh environmental conditions and to meet the exact requirements in a wide variety of applications, and can be used right or left handed.

- **Contact Ratings:** 5A 250Vac or 2A 30Vdc
- **Potentiometers:** 10K Ohm (CT) or 5k Ohm (non0-CT), 5 watt max current 1mA
- **Push Buttons:** SPST
- **Rocker Switch:** SPTST normally open (N.O.) (maintained or momentary)

Electronic Foot Pedals

GS Global Resources offers a variety of electronic suspended or floor-mounted electronic foot pedals. An important part of total machine control, our electronic throttle pedals are designed to optimize operator comfort and ergonomics. Our electronic foot pedals are also programmable and offer redundant Hall effect sensing technology for long life and improved safety.

Model: HJFC Hall Effect

This foot pedal is built to perform under the worst possible conditions. The unique design places Hall effect sensors and electronics behind a solid diaphragm that separates the top and bottom halves of the front pedal, sealing the electronics in an IP68S rated enclosure.

•**Product Life**: 9,000,000 cycles
•**Electrical:** Analog output voltage tolerance 5Vdc
•**Electronics:** IP68s sealed
•**Travel Angle:** 13° nominal dual direction, 15° nominal single direction
•**Mechanical:** Vibration 10g 10Hz to 2KHz swept sinusoidal
•**Environmental:** Operating temperature -40° to +85°C
•**Sand/Dust**: Withstand per SAE J1455

Outstanding EM/RFI Immunity

Typical Applications:
•Agricultural
•Construction
•Industrial
•Material Handling
•Off-Highway

CAN Interface Provides Three Analog Input Channels, 12 Digital Input Channels and Two Digital Output Channels

Model: WM-575 (WCS-400101) Hall Effect Rocker Pedal

The WM-575 Hall effect electronic rocker foot pedal is built for the demanding off-road environment. Its robust design is extremely durable and exhibits outstanding performance for open cab applications.

•**Product Life**: Full travel cycles 5,000,000
•**Electrical:** Dual-ratiometric sensor output 5V analog operation
•**Electronics:** IP67 sealed. EMI: SAE J1113 compliant
•**Pedal Angle:** ±14°
•**Operating Force:** Neutral = 55 N, Full travel = 75 N
•**Mechanical:** Static load (Forward/Reverse) 1500 N
•**Environmental:** Operating temperature -45° to +85°C
•**Sand/Dust**: Tested to SAE J1455

Built For the Demanding Off-Road Environment

Applications:
Throttle With Position Sensor

The EFPA (Electronic Floor Pedal Assembly) is designed to provide a signal to the engine fuel control system in response to the driver's request for engine power. A sensor is employed which provides a voltage proportional to the supplied voltage based on the angular displacement of the treadle.

Electronic Foot Pedals

Model: WM-526 Single-Axis
An electronic foot pedal designed for all commercial vehicle applications that are highly customizable. This electronic throttle control provides a robust design with a corrosion resistant cast aluminum treadle and a coated steel base plate.

•**Product Life**: Full travel cycles 10,000,000
•**Electrical:** Dual-ratiometric sensor output 5V analog operation
•**Electronics:** IP67 sealed, EMI: SAE J1113 compliant
•**Pedal Angle:** 28.5°, 35°, 45°
•**Mechanical:** Static load (forward/reverse) 1500 N
•**Environmental:** Operating temperature -40° to +85°C
•**Sand/Dust**: Tested to SAE J1455

Available in Kick-down and Non Kick-down

Applications:
Designed for all commercial applications and is highly customizable

Model: WM-542 Electronic Suspended Pedal
This electronic suspended pedal is designed for on-highway vehicle applications. The unit is equipped with a Hall effect non-contact sensor that can be programmed for analog output and/or integrated switches.

Designed for On-highway Vehicle Applications

•**Product Life**: Full travel cycles 3,000,000
•**Electrical:** Dual-ratiometric sensor output 5V analog operation
•**Electronics:** IP67 sealed, EMI: SAE J1113 compliant
•**Pedal Angle:** 20° nominal
•**Mechanical:** Static load (forward/reverse) 1500 N
•**Environmental:** Operating temperature -40° to +85°C
Sand/Dust: Tested to SAE J1455

Applications:
Throttle Control Pedal. Commonly used with Bosch 6.1 ECU. Compliant with US Standards FMVSS-124 and FMVSS-302

GS Global Resources works in partnership with our original equipment manufacturer customers and our world leading suppliers to provide custom designs for specific applications.GS Global Resources offers adjustable pedal systems for the truck, bus and other mobile markets. In addition, we provide a vast selection of standard designs available for many vehicle applications.

GS GLOBAL RESOURCES
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Sensors

GS Global Resources manufactures unique and innovative non-contact, rotary, linear, and angular position sensors with a variety of sensing technologies. In addition GS Global Resources represents several manufacture lines of sensors and transmitters that are designed and developed for extreme outdoor mobile applications.

Angle Sensors

Model: DINC & SINC

The DINC & SINC 3-Axis inclinometers are rated IP69K and report true angle change relative to set home via J1939 regardless change from installed orientation. The sensor's solid-state circuit processes raw inclinometer data with 3D vector math in real time to report accurate angle change across all three axis of rotation (X, Y and Z).

Two Individual 3-Axis Inclinometer With True Angle Change

- **Measuring Angle:** 360° x,y, and z
- **Input**: 6 to 30Vdc (90mA)
- **Output**: B-1939
- **Operating Temperature:** -40° to +80°C
- **Environmental Protection:** IP69K

Model: ATS50

The ATS50 is a non-contact, Hall effect angle/tilt sensor for mobile hydraulic applications. The ATS50 has a tough ABS plastic construction for strength and corrosion resistance. The sensor uses non-contact, Hall effect technology for trouble free operation. The sensor is very robust and able to withstand rugged applications.

Sensor Condition Monitoring 0-5Vdc Non-Contact, Hall Effect, Angle/Tilt

- **Measuring Angle:** ± 10°
- **Input**: 5Vdc
- **Output**: 0.5 to 4.5Vdc
- **Operating Temperature:** -35° to +85°C
- **Environmental Protection:** IP67

Model: STT280

STT280 sealed tilt sensor is designed to provide reliable, fit-and-forget tilt measurement sensing within an extremely compact housing, for the most arduous operating environments. The STT280 is suitable for use in applications such as road construction equipment, cranes and booms, scissor lifts, agricultural vehicles, container handling and hydraulic lift systems

Sealed Tilt Sensor, Choice of Measurement Ranges

- **Measuring Angle:** ± 10°, ± 20°, ± 30°, or ± 60°
- **Input**: 8 to 30Vdc (unregulated), 5Vdc ± 0.25 (regulated)
- **Output**: -
- **Operating Temperature:** -40° to +125°C (5V supply)
- **Environmental Protection:** IP68 to 2m (24 hour duration)

Fluid Level Sensors

Series: LF

The LF Series is a variable resistance output, non-contact float sensor suitable for a variety of applications. The sensing element is housed in an aluminum tube to protect the electronics during installation and in operation. The tube also dampens level variations due to splashing. Properties include reliability, electromagnetic immunity and ease of installation. The aluminum tube is anodized and is secured by five screws after sliding it in the top of the tank. Because of its robust design, the liquid level sensors are ideal for holding tanks, fuel tanks, and hydraulic tanks for all types of large on or off road vehicles and industrial applications.

Length: Three options: 700, 750, and 800mm length 66mm to flange + 14mm (Length + 88mm mounting)
Input: % 0Vdc
Output: 2.45 ± 0.3 to 4.42V
Operating Temperature: −40°C to +85°C
Environmental Protection: IP66

Rugged Construction Allows This Sensor to Be Used in Holding Tanks, Fuel Tanks and Hydraulic Fluid Tanks for All Types of Large, Off - or On-Road Vehicles

Sensors

Linear Sensors

Model: LP30

The LP30 Magnetic Linear Position Sensor utilizes a magnet sensing technique to allow for a fully sealed non-contacting linear sensor. The output is a J1939 CAN-bus interface that is fully sealed to IP69K. The non-contact LP30 has a wide sensing range and does not require a wire reel to measure the boom as it extends. The potted magnets are attached to the boom and the sensor measures the magnets as they pass.

•**Range:** Miles (track length dependent)
•**Input**: 6-30Vdc
•**Output**: J1939, addressable
•**Operating Temperature:** -40°C to +80°C
•**Environmental Protection:** IP69K (housing)

Incremental, Non-Contact, Linear Position Transducer

Model: LP/LZ

The Joral LP/LZ series non-contact linear sensors are IP69K wireless boom extension/ linear position devices that eliminate the common faults which occur with conventional string pot/wire reel measurement devices. Using a sealed magnetic track and a Hall effect array the LP/LZ non-contact linear position devices detect linear extension in 1/4" to 1" resolutions.

•**Range:** Miles
•**Input**: 6-30Vdc
•**Output**: J1939, CAN-open, Modbus
•**Operating Temperature:** -30°C to +80°C
•**Environmental Protection:** IP69K (housing)

Absolute Non-Contact Linear Transducer (sensor) Eliminates The Need For Wire Reel Devices That Are Prone To Freeze, Snap, or Disconnect Recoil

Model: ICT100

The ICT100 Contactless In-Cylinder Linear Transducer has been specifically designed for mobile and static hydro pneumatic actuators. Designed primarily for the off-highway markets, the ICT100 linear transducer provides reliable, fit-and-forget position sensing of the cylinder rod in actuators with strokes up to 2000mm, with a body diameter of only 10.1mm.

•**Range:** 25-2000mm
•**Input**: EICT conversion module (10-60Vdc)
•**Output**: 11 output options
•**Operating Temperature:** -55°C to +120°C
•**Environmental Protection:** EICT= IP66, EICTM=IP68

Series: SLS & MLS

The SLS and MLS series of linear position sensors are designed to provide maximum performance benefits within an extremely compact size. Using the proven benefits of Hybrid Track Technology and including a number of innovative design features, these position sensors are ideally suited to applications where high performance and reliability matched by competitive pricing and rapid dispatch is of paramount importance.

Features:
•Cable integrally molded
•CE approved
•Choice of mounting
•Compact body to stroke length
•Rapid dispatch
•Reduced weight
•Sealing to IP66 and corrosion resistant rod end bearings

Benefits:
•Confidence in EMC performance
• Eliminates customer inventory
•Excellent strain relief with secure seal
•Ideal for mobile applications
•Reduced installation space
•Suitable for hostile environments

Sensors

Position/Speed Sensors

Model: FP2000, FP3000, FP4000 (Ferrous Proximity Sensor)

The FP Series is a family of proximity sensors for mobile and other applications. They are available with two sensing air gaps and with two different sense surfaces. To make the sensor suitable for mobile and industrial equipment, we have focused upon such properties as reliability and ease of installation.
The passive sensors use non-contacting technology, through the use of an internal reed switch, for trouble free operation. They have a glass-filled nylon housing for strength and corrosion resistance and extra large mounting holes for easy alignment. A sealed Deutsch connector combined with potted electronics gives the sensor excellent protection for exposed outdoor applications.

- **Contacting Range:** 10, 3, 45
- **Switching Voltage:** 100Vdc, 30Vdc, 12Vdc
- **Switching Current:** 0.5 A, 0.2 A, 5 A
- **Operating Temperature:** -40°C to +105, 85°C
- **Environmental Protection:** IP67

There Are No Mechanical Components and the Electronics are Encapsulated in Epoxy Very Robust and Suitable for Mobile Applications

Non-Contacting Technology to Detect the Presence of Metal Objects

Pressure Sensors

Model: IQAN-SP

The IQAN-SP pressure transducers belong to the family of IQAN accessories developed to complement IQAN control systems. IQAN-SP is a range of pressure transducers for mobile hydraulic applications. These transducers are available in two pressure ranges; 35 bar (500 psi) and 500 bar (7250 psi). The signal range is between 0.5 - 4.5 VDC over the full-scale of the sensor. The IQAN-SP comes in 2 configurations:

- **Range:** 35 bar, 500 bar
- **Input**: 5.0Vdc
- **Output**: 0.5 to 4.5Vdc
- **Operating Temperature:** -40°C to 125°C
- **Environmental Protection:** IP67

- **G1/4 BSPP:** Threaded interface with integral AMP/Tyco (Bosch Jetronic) connector
- **9/16-18 UNC (6 SAE):** Threaded interface with Deutsch DT connector attached to a short cable

Rotary Sensors

Model: JZ Zero Power Position

The JZ Absolute Zero Power Position Sensors, zero power capability permits position sensing while powered down.

- **Range:** Continuous
- **Input**: 6 to 30Vdc
- **Output**: J1939 12-bit @4096 positions, or Modicon Modbus 12-bit @4096 positions
- **Operating Temperature:** -30°C to 80°C
- **Environmental Protection:** IP69K (connector dependent)

Model: TZ "Through Shaft" Absolute Zero Power Position Sensor

The TZ sensor maintains absolute count while totally disconnected from source power. The magnet package can be modified to fit unique installations.

- **Range:** Continuous
- **Input**: 6 to 30Vdc
- **Output**: J1939 12-bit @4096 positions, or E-485 RS-485 12-Bit output
- **Operating Temperature:** -30°C to 80°C
- **Environmental Protection:** IP69K (connector dependent)

Sensors

Rotary Sensors
Model: PE30

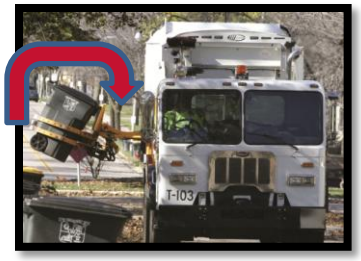
The PE30 sensor is a non-contact rotary encoder that is extremely compact in design and is J1939 capable. Patented true non-contact position sensing; 0.5" (12mm) gap between sensor and application,0.10" (2.5mm) center alignment ,30° planar tilt ,LED indicators for power and output feedback with incremental or absolute position.

•**Range:** Continuous or scaled
•**Input**: 6 to 30Vdc
•**Output**: PPR- incremental 13 bit quadrature single ended output. PPR- Incremental 13 bit quadrature with differential output. J1939 13 bit @1000 positions std. (8192 max special), voltage out 0-5Vdc and 4-20mAmp. PWM and SSI also available
•**Operating Temperature:** -30°C to 80°
•**Environmental Protection:** IP69K (connector dependent)

Compact IP69K Non-Contact Rotary Absolute Single-Turn, Multiturn or Incremental Encoder

Rotary – Angle Sensors
Series: RF RS

The RF & RS rotary angle sensors have a variety of working angles and shaft types to fit your specifications. The RF50 is a friction rotary control with 90° travel. The RS52 is a spring-loaded 90° sensor. For added safety, we offer two sensors with redundant outputs. The RS60 is a spring-loaded sensor with 120° travel that accepts thru shafts. The RS70 is a spring-loaded sensor with 170° travel.



Features:	RF50	RS52	RS60	RS70
Friction	Yes	No	No	No
Spring Return	NO	Yes	Yes	No
0.5-4.5Vdc Signals	1	1	2	2
Working Angle (°)	90	90	120	170
Coupling	¼" shaft	5/16" tang	07/8" thru	5/16" hex

Rotary – Position Sensors
Series: NRH, SRH, TPS

The NRH, SRH and TPS contactless rotary position sensors have been specially developed to provide maximum performance under extremes of temperature, humidity, vibration, shock and immersion. Using the latest advances in 12bit Hall effect sensing technology, this expanded range of new generation sensors are factory programmed to provide the user with a wide range of previously unavailable options.

Outputs: Including single or dual redundant
Rotation: Clockwise or anticlockwise
Measurement Angles: From 0-20° to 0-360° in 1° increments

Series: SRS

An extensive range of rotary position sensors which offer, inductive and potentiometric technologies. The SRS280 sealed rotary sensors and SRS880 submersible rotary sensors have been specifically designed to provide maximum performance under extremes of temperature, humidity, vibration, shock and immersion.

Angle Measurements: 10° to 360°
Housings: Packaged in compact or rugged housings
Environmental Protection: IP68 and IP69K

Temperature Sensors

For harsh mobile environments, GS Global Resources temperature sensors have a proven temperature sensor with signal conditioning. Contact GS Global Resources for details.

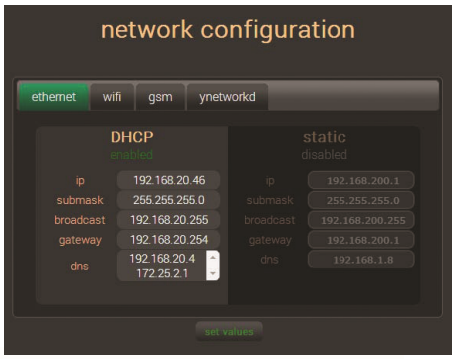
Remote Monitoring and Telematics

The next–generation CAN interface for worldwide communication with CAN networks via GSM/GPRS plus optional positioning with GPS. Global CAN communication monitors and maintains your machine. For heavy trucks and off-road equipment telematics, the installations of a third party telematics box just became simplified with GS Global Resources engineered solutions with J1939 bus and electronic controls modules.

Model: ESX-TC3

- A built in GPS module that continuously monitors position
- Antennas fully integrated inside the module
- Innovative SIM card replacement through the connector
- IP69K housing that works great in harsh off-road conditions
- The module has all of the standard interfaces such as RS232, USB and Ethernet
- Wireless communication by Bluetooth, WLAN and GPRS

Linux Bases Telematics Module with Integrated Antenna



Remote diagnostics

- Current versus future state
- Project deliverables
- Project time line
- Maintains machine performance data

Radio Remote Controls

Wireless technology is a proven solution for flexible remote machine control. Integrating the wireless controller with the CAN and including operator feedback, provides a cost effective, efficient, and safe control network for a machine operator.

Handheld Transmitters Tethered or Wireless

Choose from a wide range of handled transmitters to control hydraulic systems used in mobile hydraulic equipment applications.

- 4, 8, or 12 button options with single step control, 14-button Tethered
- Cost effective solution to the restrictive use of hardwired pendants
- Designed to prevent operator fatigue
- Easy one-hand operation
- Ergonomically designed contoured case
- E-Stop
- I-CHIP module, universal transmitter that can be programmed in the field
- J1939 Pendant
- LEDs provide diagnostic and system status
- Long life battery – rechargeable NiMH battery pack available
- NEMA 4 (IP66)
- On-off control
- Pushbutton-Proportional dual step/single step
- Rugged
- Status speed control

Customized Programming Capabilities

Belly Box Radio Transmitters

GS Global Resources belly box radio transmitters are manufactured for the mobile hydraulic market requiring multiple functions and precise control. These radio remotes offer finite control over lifting heavy loads, making them ideal in applications like concrete pumping, mobile crane and road machinery.

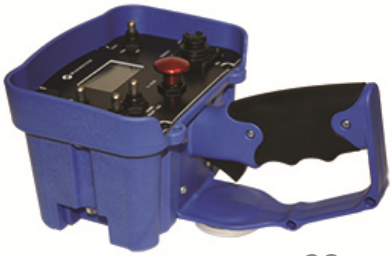
- Custom programming messages available
- Gated or non gated joystick control
- Highly durable for a variety of applications: Boom trucks, cement trucks, mining equipment and more
- LCD optional
- LED's: red, yellow, green, up to 4 per transmitter
- NEMA 4 (IP66)
- Optional certification for hazardous locations
- Rechargeable NiMH battery pack available
- Size and function variations informative graphic display with two-way feedback
- Standard Pre-engineered or off-the-shelf systems
- Variations of toggle switches and inputs are available for on/off functions
- Versatile and feature rich options
- Windows PC with Radio Control Programmer (RCP)

Options for Hazardous Locations

Pistol Grip

GS Global Resources pistol grip wireless transmitters embodies the latest electronic technology. customized to meet your needs. The single proportional trigger version is an extremely economical option for controlling multiple proportional hydraulic valves.

Ergonomically Styled



- Available with steeples proportional controls
- Custom programming messages available graphic display
- Numerous combinations of toggle, selector switches and potentiometers
- Nema 4 (IP66)
- RF, Frequency options of 433MHz, 900Mhz and 2.4Hz
- Select up to 15 toggle switches

Radio Remote Controls

Innovative, cost-effective wireless controls complete with plug-and-play hydraulic interface controls are designed to meet customer specifications, reducing internal engineering and manufacturing costs, improving time to market, and enhancing equipment performance. GS Global Resources, in collaboration with our partner, offers wireless controls for mobile hydraulic applications that provide hydraulic equipment operators with better positioning for job visibility and safety, allow for data feedback, and extend the lives of machine and hydraulic components.

Full LCD Display

Receivers

MHR Radio Controller

The MHR wireless radio control combines components of a radio receiver and hydraulic controller into a convenient single unit. The MHR includes an informative LCD graphic display for viewing system settings and machine functions.

Features and Benefits

- Rugged, waterproof design is resistant to shock and vibration, making it ideal for outdoor use and harsh environments
- **User Interface Features:** Fully sealed pushbuttons for menu navigation and modifying system settings in the field
- **Two-way Feedback:** Provides precise information about equipment performance
- **Optional Radio Control Programmer (RCP):** Allows settings to be programmed from a Windows PC

Frequencies

- **Part 15 License Free:** 430-440MHz, 2.4-2.5GHz
- **Operation Range:** Up to 2,000 feet

Optional Radio Control Programmer (RCP) Allows Settings to be Programmed from a Window PC

CAN-2 Receiver

The CAN-2 receiver allows you to tap on to most CAN-bus systems supporting a variety of CAN protocols. The small compact design is rugged enough to handle outdoor environments, and the quick response allows for precise control, without the latency found in other radio control systems.

- **Outputs:** 2 digital (used for machine stop)
- **Communication:** 1 CAN-bus
- **Frequencies:** Part 15 License Free 430-439.8MHz, 2.4-2.5GHZ
- **Operating Range:** Up to 2,000 feet
- **Diagnostics:** LED diagnostics or back to controller display
- **Input Voltage:** 12-24Vdc nominal (6-326Vdc max)

Radios Are Available With Special Operational Functions to Provide Even More Control Options

Flex 4/6 EX Receiver & Flex 8/12 EX Receiver

Flex EX receivers were designed with field installation and serviceability in mind. Receivers come prewired with 6' of cable and mounting hardware allowing fast installation. Onboard diagnostic and output LEDs provide system status information useful when installing and troubleshooting. All components are easily accessible and field replaceable. The IP66 rated fully sealed receiver enclosures provide you with confidence and protection in the harshest indoor or outdoor environments.

- **Outputs:** 4/6: 8 motion relays, 1 MLC relay, 1 horn relay
  8/12: Up to 24 motion relays, 1 MLC relay, 1 horn relay
- **Inputs:** NA
- **Communication:** NA
- **Frequencies:** Part 15 License Free 433-440MHz
- **Operating Range:** Up to 300 feet
- **Diagnostics:** Onboard diagnostics with LED indicators for receiver status

Manifold & Custom Valve Package Solutions

GS Global Resources specializes in designing custom manifolds. Our understanding of manifold design has allowed us to deliver essential competitive advantage OEMs have come to expect from GS Global Resources.

GS Global Resources works closely with our customers from concept through production launch. Our engineering department supports our customers with sound documentation including assembly drawings, 3D CAD model, CAN, PLC and embedded microcontroller software, schematics, BOMs, hydraulic circuit simulations and graphic art.

At GS Global Resources, our leading engineering minds in hydraulic, electronic, mechanical and software applications simplify the complex.

GS Global Resources engineered solutions are designed to improve the competitiveness and functionality of your machine.

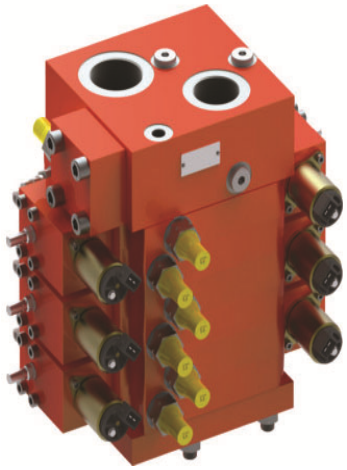
Proportional Hydraulic Valve Control

Benefits:
•Consolidated control of the hydraulic system
•Ease of plumbing
•Reduced potential for leakage
•Reducing size, weight and cost
•Reducing the amount of hoses and fittings needed

New Modular Valve Systems Opens Doors to Customized Mobile Hydraulic Solutions
High levels of functionality and power density, as well as optimum energy utilization and designs that are as compact as possible are the biggest challenges for hydraulics in mobile applications. From mobile cranes through reach stackers to ground-drilling rigs – innovative hydraulic drive systems are a significant factor in global competition between high-performance, market-focused machines.

Model: SC18 Proportional Directional Valves
Modular System

•**Hydraulic Fluid Temperature:** -20 to +80°C
•**Nominal Flow Rate:** 260 l/min
•**Rated Pressure, Max.:** 42- bar (actuator ports)
•**Tank Line Pressure, Max:** 50 bar
•**Types of Operators:** Electrical, hydraulic, manual or combinations of them
•**Working Pressure, Max.:** 350 bar
•**Viscosity Range:** 10-380 mm2/s



IQAN

A rapid development environment for a sophisticated, yet easy to use control system designed for rugged mobile machinery.

More flexibility, more connectivity, more possibilities

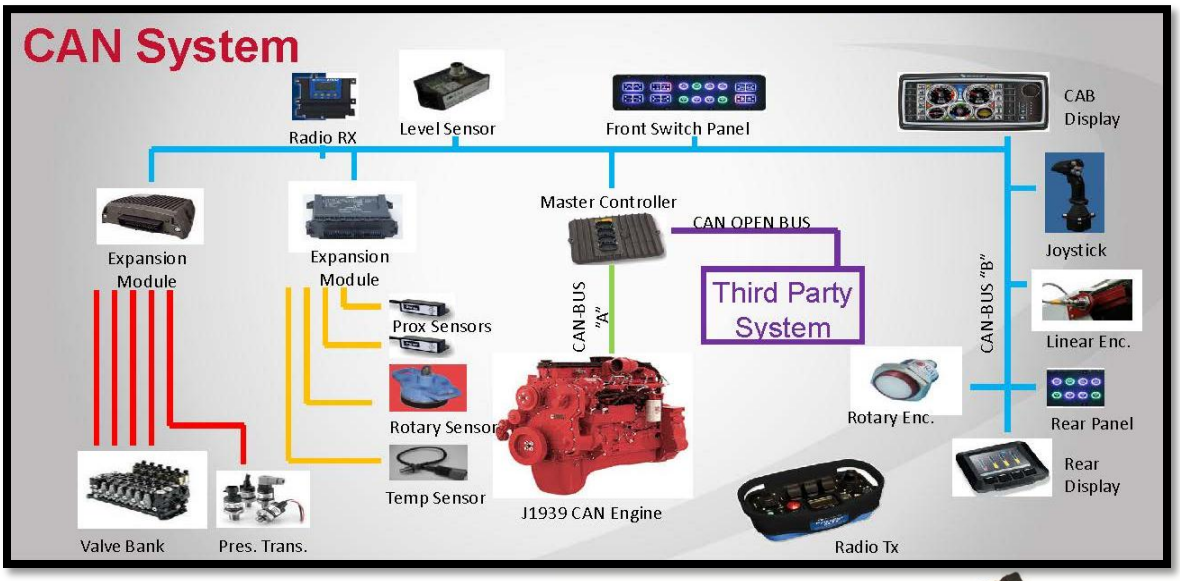
IQAN is a state-of-the-art system, developed by Parker Hannifin, for electronically controlling and monitoring hydraulics in mobile machines.

IQAN communicates with the other systems in the machinery, such as diesel engines and transmission systems.

IQAN master units display data from these systems allowing control of them. IQAN is user-programmable via a high level graphical design tool, which dramatically simplifies development.

Simulation of the control system takes place in parallel with the programming of machine functions.

The IQAN software tools cover all phases of a machine's life cycle, from development through productions to after sales.



IQANdesign 4.0 maintains all the previous features of version 3.0 and remains fully backwards compatible, ensuring customers are supported along the migration path. Key benefits of the new platform include enhanced programming capabilities, improved simulation, extended connectivity and higher run-time performance. Qcode is a "new and intuitive, self-instructing editor that offers a new way to program in IQANdesign." With Qcode; the user is able to reduce channel count by using powerful in-built Qcode expressions alongside the enhanced flexibility to re-use single channels across the entire application structure. Incorporated into Qcode is automated syntax checking which clearly indicates to the user code statements that need addressing. Coupled with clear and readable functions, syntax highlighting, auto-complete and the ability to document functions the latest generation IQANdesign software makes for an extremely usable and flexible editing platform that requires minimal programming knowledge.

The New Features Bring Greater Ease-of-Use While the Increased Speed and Performance Ensures that GS Global Resources' Customer Systems Continue to Demonstrate Leading-Edge Performance

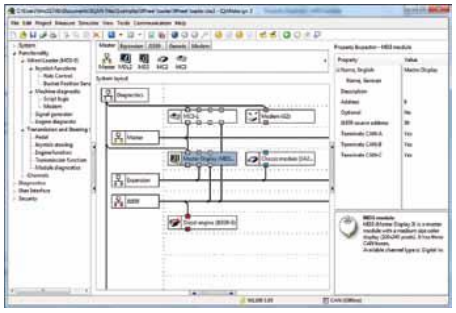
IQANdesign Platform

D S R S

Design Simulate Run Script

The main philosophy behind the IQAN Creative Studio is that the OEM, with their extensive knowledge of their machine, should be able to write the desired machine functionality directly, without having programming experience.

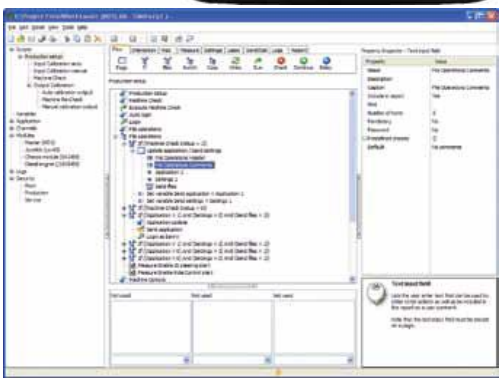
The IQAN software studios cover all phases of the machine life cycle, from development through production to after sales. There are three different studios available; IQAN Creative Studio, IQAN Productive Studio and IQAN Active Studio.



IQANdesign
IQANdesign is a high level graphical design tool which simplifies application development for your mobile machine and reduces development time.

IQANsimulate
IQANsimulate is a simulation tool, which simplifies function test, validation and reduces development time. It simulates all of the hardware modules in an IQAN application. Software simulation is a safer way to test new applications than on an actual machine.

IQANrun
During the development phase you can use IQANrun to optimize your machine's performance with the help of IQANrun's advanced graphical measure and machine statistics collection functions.



IQAN Productive Studio - Script
The script concept was developed to help original equipment manufacturers production departments to create routines for testing, tuning, setting options, logging, delivery sheets, etc. The service department can also take advantage of scripts to create tailor-made fault-finding trees, service procedures, intervals and much more.

The IQAN System Solution Is One of the Most Versatile and Easy To Implement Control Solutions on the Market

Parker – IQAN Training
GS Global Resources offers two different IQAN training sessions, Basic and Advanced. You'll be set up with your own workstation for a hands-on experience. Our training provides you with the information and experience you need to properly use all of the IQAN products in your desired applications. This will ensure the long life of the products and the correct setup for your application.

GS GLOBAL RESOURCES
Foremost in Machine Performance for Life

Meet E-Force by GS Global Resources

Control What's Next with E-Force by GS Global Resources

E-Force is an elite engineering team within GS Global Resources. These are the industry's leading engineering minds for solving problems at the intersection of fluid power and electronic control. And they only tackle the most difficult mobile and industrial machine challenges. Working alongside OEM engineering and sales teams, E-Force offers rare expertise gained from countless OEM application assignments around the world.

Through a highly selective process, E-Force advances an OEM's ability to profit from the convergence of hydraulic, electronic, mechanical and software applications. E-Force provides the best-of-the-best in advanced prototype development guidance for mobile and industrial machines. When you engage E-Force, you enter a relationship designed to continuously transfer technology and innovation to your team.

E-Force stands ready to educate OEMs on how to approach mobile and industrial machine applications. Pragmatic, market-leading concepts drive their recommendations. From system and component design to production and market support, E-Force now provides OEMs access to rare, globally-tested engineering talent.

When you engage E-Force, you will experience a comprehensive approach to simplify the complex. You will experience a team dedicated to delivering competitive advantage. And, you will experience a team committed to delivering machine performance improvement every time.

E-Force exists solely to provide advanced insight into the toughest OEM challenges. Whatever the challenge, E-Force delivers integrated application solutions that perform for the life of the machine, and for the lives of the people who touch it.

To access the world's leading engineering minds in fluid power and electronic control, contact us at engineeredsolutions@gsgr.com

GS GLOBAL RESOURCES
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Engineered Solutions

GS Global Resources offers engineered integrated application solutions that apply to almost any industry. No matter the challenge, we provide our customers with custom innovative CAN solutions to give you total machine control with today's newest, proven, reliable technology.

•The Outrigger Safety System (OSS) from GS Global Resources provides the work truck industry with a building block approach to prevention of common outrigger accidents.
•Useful for a work truck owner or fleet manager. Our basic system consists of outrigger position sensing to ensure the work truck is ready for safe road travel.
•Upon disengaging the parking brake, unsafe conditions are reported in cab with both visual and audible alerts.
•A more advanced system builds upon the basic system by validating that the outriggers have been fully deployed and that work is ready to be performed safely.
•Additional options include ground pressure monitoring to assist the operator in avoiding unstable soil conditions.
•Our most advanced system adds truck level sensing to ensure your truck mounted crane is used under the safest possible conditions.

Basic System Consists Of:
•90dB In-Cab Alarm
•OSS Master Module
•OSS In-Cab Display
•Position Sensors

Scalable OSS Packages:
•One and two outrigger systems
•Precise outrigger position sensing
•Precise ground pressure sensing
•Truck level – switched or sensed
•Up/in and out/down outrigger position switch
•Up/in outrigger position switch

Optional Display with Camera Input

For original equipment manufacturers the OSS can be customized to include any or all of the features above, along with dynamic crane load limiting which is programmed to meet the specific load limits of your crane. User-friendly software allows for integration of the OSS into your total machine control solutions. Additional hardware options include an in-cab display with multiple camera inputs. GS Global Resources offers a real-time clock feature that allows for data logging of pre-defined significant operating events.

Engineered Solutions

A crane load management (CLM) system that incorporates boom-pressure transducers, and dual axis sensors that provide feedback on machine and boom angle status for the ultimate in safe crane operation. Utilizing the latest in CAN technology, the total machine control solution provides improved safety and increased productivity resulting in a mobile hydraulic crane design with numerous industry-first innovations that meet the customer's expectations.

GS Global Resources Specializes in Integrated Total Machine Control

Function & Control

Angle Sensor - Machine Frame and Boom

GS Global Resources angle sensors are key factors in the load management solutions for a crane or machine lift system. By measuring the angle of the machine from front to back and side to side, a determination of safe lift can be assessed.

By knowing the slope angle that the machine is resting, warnings can be set at different angles. For example 5 percent slope is a warning alarm, 8 percent slope is a shutdown or a reduction in crane maximum load capability.

Safe level range will allow for a proper crane lift. If the machine is off level we can now measure boom angle relative to the frame of the machine. Measuring from boom to frame allows for true load calculations for the lift and a safe operation of the vehicle.

Functionality of machine controls from basic to advanced monitoring.

A Scalable Design Platform:

- Allow for three platform configurations with options for customer needs and machine features
- Develop an advanced control for a truck that will meet cost and performance goals
- Different kits for different types of functions on the machine
- LCD readout quick machine status, service status
- Option control kits Integrated into the master system
- Outrigger status, crane load (Load Indication)
- Machine level, error and event logging
- Relay control with operational status, winch last wrap indication

Wireless control systems that accommodate a multitude of hydraulic trucks of all sizes, configurations and applications. GS Global Resources has the knowledge and experience needed to solve today's complex control system problems. Our engineering team specializes in developing, prototyping and optimizing control solutions. We work closely with our customers from concept through production launch.

ABOUT GS GLOBAL RESOURCES

GS Global Resources is the foremost machine performance resource. We are trusted by the world's most recognizable OEMs who demand competitive advantage from every solution. Our integrated application solutions perform for the life of the machine, and for the lives of the people who touch it.

From system and component design to production and market support, GS Global Resources helps OEMs interpret, adapt and adopt technology.

Our leading engineering minds in hydraulic, electronic, mechanical and software applications simplify the complex. We use innovative, reliable technologies to speed solutions to market. And, whether reacting to market forces or changing markets altogether, GS Global Resources is essential to achieving total machine performance.

CONTACT

Please visit GSGlobalResources.com or contact us directly for more information. Our dedicated team of long-term, invested employees looks forward to working with you.

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