

APPLICATION GUIDE

For SHENGLI[®] Gas Engines



GAS ENGINE TECHNOLOGY

reliable • efficient • worldwide

Ignition Controllers & Harnesses

MIC4 Ignition Controller



Scan QR Code®



Scan QR Code®

- **High energy ignition controller**¹⁾
- 300 mJ ignition energy (500 mJ boost for start phase)
- Multiple energy control via MOST (MOTORTECH Output Stage Technology)
- Programmable spark duration (100 to 1000 µsec)
- 17 pole MIL connector (socket) for output connection
- 35 pole MIL connector (pin) for input connection
- For 12V190, 16V190 series

Equivalent to:

P/N M8601-0034-0016 SHENGLI® P/N SDIC-01

Optional

- **PowerView3 HMI module**
- Visualization of ignition control via CAN bus
- Overview with status indication for
 - Active schedule
 - Analog display of engine speed
 - Ignition timing
 - Spark plugs (operating hours)
- Display of global ignition timing
- Displays the ignition of each cylinder
 - Ignition voltage
 - Misfires
- Display and adjustment of energy
 - Spark duration
 - Spark intensity
- Warning, alarm and error messages
- Input harness P/N M8601-0116-0160 required for connection to MIC4 ignition controller

P/N 06.05.085
alternative

PowerView3 HMI module

P/N 06.05.185

PowerView3 HMI module,
built into stainless steel enclosure

P/N 06.05.086-F

PowerView3 activation code
for visualization of MIC4 data
(has to be ordered separately with each
PowerView3 HMI module)

¹⁾ Patented technology (Patent No. US 8,893,692 BS)

Output Harnesses

- **Output harness for MIC4 ignition controller**
- For unshielded applications up to 16 cylinders
- MIL connector, 17 pole, pin, 180°
- 8.0 m/25 ft length
- Fits P/N M8601-0034-0016

P/N M8601-0101-0025



Input Harnesses

- **Input harness for MIC4 ignition controller**
- For unshielded applications
- MIL connector, 35 pole, socket, 180°
- 4.0 m/160 in length
- Incl. connection for 1 Hall Effect pickup
- Incl. wiring for RS485 (Modbus RTU) interface, 2 wire
- Fits P/N M8601-0034-0016

P/N M8601-0110-0160

Optional to P/N M8601-0110-0160

- **Input harness for MIC4 ignition controller**
- For unshielded applications and connection to PowerView3 HMI module
- MIL connector, 35 pole, socket, 180°
- 4.0 m/160 in length
- Incl. connection for 1 Hall Effect pickup
- Incl. wiring for RS485 (Modbus RTU) interface, 4 wire
- Incl. wiring for CAN Bus interface, 4 wire
- Fits P/N M8601-0034-0016

P/N M8601-0116-0160



■ Ignition Coils

Ignition Coils



- **New MOTORTECH Style ignition coil**
- (-) ground
- For unshielded applications
- For use with MIC4 ignition controllers

P/N M8601-0207 Equivalent to: SHENGLI® P/N SD-Coil-01-06.50.113



- **ALTRONIC® Style ignition coil**
- (-) ground
- For unshielded applications
- For use with MIC4 ignition controllers

P/N M8601-0208



- **ALTRONIC® Style ignition coil**
- (-) ground
- For unshielded applications
- For use with ALTRONIC® ignition controllers

P/N M8601-0204 Equivalent to: ALTRONIC® P/N 501061

Accessories

- **Ignition coil boot**
- For primary side, 180° outlet
- Made of silicone
- Fits MOTORTECH/ALTRONIC® ignition coil P/N M8601-0204, 501061

P/N 06.80.036

- **Ignition coil boot**
- For primary side, 180° outlet
- Made of silicone
- Fits MOTORTECH ignition coil P/N M8601-0208

P/N 06.80.005

- **Ignition coil boot**
- For primary side, 90° outlet
- Made of silicone
- Fits MOTORTECH ignition coil P/N M8601-0207

P/N 06.84.082



■ Ignition Coils

Tools & Test Equipment



Scan QR Code®

- **SparkView high voltage indicator incl. SparkScan1 high voltage clamp**
- For use with spark plug leads (7 mm ignition cable, without silicone hose)

Quick and comfortable monitoring on a running engine makes it possible to detect:

- Wear of spark plugs
- Failure of the ignition system (damaged ignition coil, spark plug lead or ignition controller)
- Faulty compression of a cylinder

P/N M8601-1606-0100

For use with spark plug leads
(incl. SparkScan1 high voltage clamp)



Scan QR Code®

- **Ignition coil tester**
- Professional tool to test all different kinds of ignition coils
- Built in CD ignition, high voltage clamp and a spark gap allow realistic testing
- Incl. standard adaptor kits for commonly used ignition coils on SHENGLI® gas engines

P/N 06.98.054

■ Pickups & Trigger Drives



Pickups

- **Hall effect pickup – active low**
- Thread size 5/8-18 UNF
- 2.50 in length
- For unshielded and shielded applications

P/N M8601-0302-0250

Equivalent to:

ALTRONIC® P/N 791050-2



Trigger Discs with Magnets – Compatible with MOTORTECH Ignition System

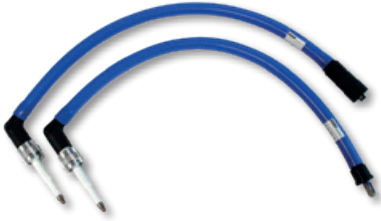
- **Trigger disc with magnets**
- Diameter 5.00 in
- 6+1 events
- For use with 12 cylinder gas engines
- For 12V190 series

P/N 06.20.325



■ Spark Plug Leads & Extensions

Spark Plug Leads



- **Unshielded safety lead**

- For use with “S2-Type” extended barrel spark plugs
- Ceramic terminal for spark plug connection, 2 inch termination well depth, 90°
- Ignition coil connector, 180°, fits P/N M8601-0204, 501061

Equivalent to:

P/N M8601-0650-0018 STITT® P/N USL2LE-18A



- **Brush kit to clean termination wells**

- For use with ignition coils, spark plug leads and extensions or extended barrel spark plugs
- Easy to use tool cleans away dirt and corrosion safely
- Helps to increase component service life
- Bristles are of nylon impregnated with silicone to clean without scratching or removing any Teflon®

P/N 07.98.075

■ Spark Plug Leads & Extensions



NOTES

Ignition Tools & Test Equipment

Ignition Tools & Test Equipment



Scan QR Code®

■ SparkView high voltage indicator incl. SparkScan1 high voltage clamp

- For use spark plug leads (7 mm ignition cable, without silicone hose)

Quick and comfortable monitoring on a running engine makes it possible to detect:

- Wear of spark plugs
- Failure of the ignition system (damaged ignition coil, spark plug lead or ignition controller)
- Faulty compression of a cylinder

P/N M8601-1606-0100 For use with spark plug leads (incl. SparkScan1 high voltage clamp)



■ SparkScan1 high voltage clamp

- Attached to a conventional ignition cable (7 mm) and connected to a scope meter, the operator can analyse the ignition trace
- Allows preventive maintenance of the equipment by measuring high voltage peak (kV) and spark duration (μ sec) of all cylinders of an engine in a routine manner
- 2.0 m/7.0 ft length

P/N 06.90.100

■ Digital scope meter

- Compact 20 MHz or 40 MHz two channel scope
- Ideal for troubleshooting of industrial machinery, instrumentation, control and power systems



P/N 06.98.005-110 Digital scope meter, 110 V

P/N 06.98.005-220 Digital scope meter, 220 V

Ignition Tools & Test Equipment



Ignition Tools & Test Equipment

- **Ignition coil tester**
- Professional tool to test all different kinds of ignition coils
- Built in CD ignition, high voltage clamp and a spark gap allow realistic testing
- Incl. standard adaptor kits for commonly used ignition coils on SHENGLI® gas engines

P/N 06.98.054



Scan QR Code®

- **ScopeLite timing light**
- Timing light is self-powered and designed to work with fully shielded ignition systems
- The special clamp picks up the small trigger signal through the braid of shielded spark plug leads
- Can be attached directly to the BNC connector of MOTORTECH ignition coils with diagnostic interface
- Even on applications with integral or standard flange ignition coils, the clamp can be attached to a shielded primary lead

P/N M8601-1610-0200 ScopeLite timing light with LEDs, incl. clamp, 200 in standard connecting lead and carrying case



Scan QR Code®

- **Timing light – conventional style**
- Timing light is self-powered and designed to work with unshielded ignition systems

P/N M8601-1608-0010 Timing light with 3.0 m / 10 ft lead length
P/N M8601-1608-0030 Timing light with 9.0 m / 30 ft lead length



- **Brush Kit to clean termination wells**
- For use with ignition coils, spark plug leads and extensions or extended barrel spark plugs
- Easy to use tool cleans away dirt and corrosion safely
- Helps to increase component service life
- Bristles are of nylon impregnated with silicone to clean without scratching or removing any Teflon®

P/N 07.98.075



■ Spark Plugs & Accessories



Spark Plugs (M18x1.5 Thread Size – 0.500 in Thread Reach)

■ **MOTORTECH XT spark plug – for use with unshielded safety lead**

- J-type electrode (Ir/Ir)
- HEX 7/8 in (22.2 mm)
- 3/4-20 UNEF thread for unshielded safety lead
- 15 in barrel length
- Recommended for natural/special gas
- For 12V190 series

P/N M8602-0030-0015

Equivalent to:

STITT® P/N S-R807BEX15-2

Optional to P/N M8602-0030-0015

■ **MOTORTECH XTL spark plug with integrated spark plug lead**

- J-type electrode (Ir/Ir)
- HEX 7/8 in (22.2 mm)
- 15 in barrel length
- 20 in ignition cable length
- Ignition coil connector to fit P/N M8601-0207, M8601-0208, M8601-0204, 501061
- Recommended for natural/special gas
- For 12V190 series

P/N M8602-0045

■ Spark Plugs & Accessories



Spark Plugs (M18x1.5 Thread Size – 1.000 in Thread Reach)

- **MOTORTECH XTL spark plug with integrated spark plug lead**
- J-type electrode (Ir/Ir)
- HEX 7/8 in (22.2 mm)
- 15 in barrel length
- 18 in ignition cable length
- Ignition coil connector to fit P/N M8601-0207, M8601-0208, M8601-0204, 501061
- Recommended for natural/special gas
- For 16V190, 20V190 series

P/N M8602-0048



■ Spark Plugs & Accessories



Tools

■ Spark plug gap setting tool

- For easy setting of spark plug gaps
- Basic kit includes M18x1.5 thread adaptor
- Required accessory kit needs to be ordered separately

P/N 07.98.120-18

Fits Spark Plugs with Thread Size
M18x1.5



■ Accessory kit for J-type spark plugs

- Including base insert and feeler gauge

P/N 07.98.122-A



Scan QR Code®



P/N 07.98.037

- Feeler gauge clamp

P/N 07.98.059

- Feeler gauge, gap 0.008 in./0.20 mm

P/N 07.98.034

- Feeler gauge, gap 0.010 in./0.25 mm

P/N 07.98.035

- Feeler gauge, gap 0.012 in./0.30 mm

P/N 07.98.036

- Feeler gauge, gap 0.014 in./0.35 mm



■ Spark plug cleaning kit

- Removes oil residues and deposits in the electrode area by high pressure
- Special blasting grit for gentle cleaning of the electrode and thread area
- Only for use with spark plugs without pre-chamber

P/N 44.01.023



Scan QR Code®

■ Spark Plugs & Accessories



Tools

■ Spark plug socket for MOTORTECH XT/XTL spark plugs

- 1/2 in drive
- HEX 7/8 in (22.2 mm)

P/N 07.99.022-6-2

Fits Spark Plug
M8602-0030-0015,
M8602-0045,
M8602-0048



■ Torque wrench

- 1/2 in drive

P/N 07.98.065



■ Seat & thread reconditioner

- Cleans cylinder head threads and seal seats in one operation
- M18x1.5 thread size

P/N 07.98.118-12

Thread reach
1/2 in



■ Seat & thread reconditioner

- Cleans cylinder head threads and seal seats in one operation
- M18x1.5 thread size
- 16 in barrel length
- 1/2 in drive

P/N 07.98.118-12-BEX16

Thread reach
1/2 in



■ Spark Plugs & Accessories

Tools



■ Extended barrel thread plug gauge – Go/No-Go

- Inspection tool to check whether the actual dimension of the thread is within the tolerance or whether it needs to be reworked
- 16 in barrel length

P/N 07.98.077-BEX16

Thread reach

M18x1.5



■ Extended barrel thread cutting taps

- For recutting of worn threads
- 16 in barrel length
- 1/2 in drive

P/N 07.98.067-BEX16

Thread size

M18x1.5



■ SparkView high voltage indicator incl. SparkScan1 high voltage clamp

- For use spark plug leads (requires SparkScan1 high voltage clamp)

Quick and comfortable monitoring on a running engine makes it possible to detect:

- Wear of spark plugs
- Failure of the ignition system (damaged ignition coil, spark plug lead or ignition controller)
- Faulty compression of a cylinder



Scan QR Code®

P/N M8601-1606-0100

For use with spark plug leads
(incl. SparkScan1 high voltage clamp)



■ Brush kit to clean termination wells

- For use with ignition coils, spark plug leads and extensions or extended barrel spark plugs
- Easy to use tool cleans away dirt and corrosion safely
- Helps to increase component service life
- Bristles are of nylon impregnated with silicone to clean without scratching or removing any Teflon®

P/N 07.98.075

■ Spark Plugs & Accessories



Accessories

- **Spark plug gaskets**
- For M18x1.5 thread size
- Pack of 100 pcs

P/N 02.85.016-100

- **Thread lubricant**
- Can 4 oz/115 g

P/N 07.98.718



Gas Engine Control Systems

Detonation Control Upgrade for SHENGLI® Gas Engines

Next to the ignition system, MOTORTECH also offers complete system upgrades for detonation control. Prefabricated and prewired components make the conversion easier and reduce costs based on engine downtime. Please consult the factory or your nearest MOTORTECH sales partner to get a complete system solution specified for your engine application.

Upgrade your engine and increase availability of the equipment!

Necessary Components

- 1 DetCon20 control unit*
- 2 Detonation sensor lead
- 3 Detonation sensor

Accessories

- A AlphaRail detonation wiring rail

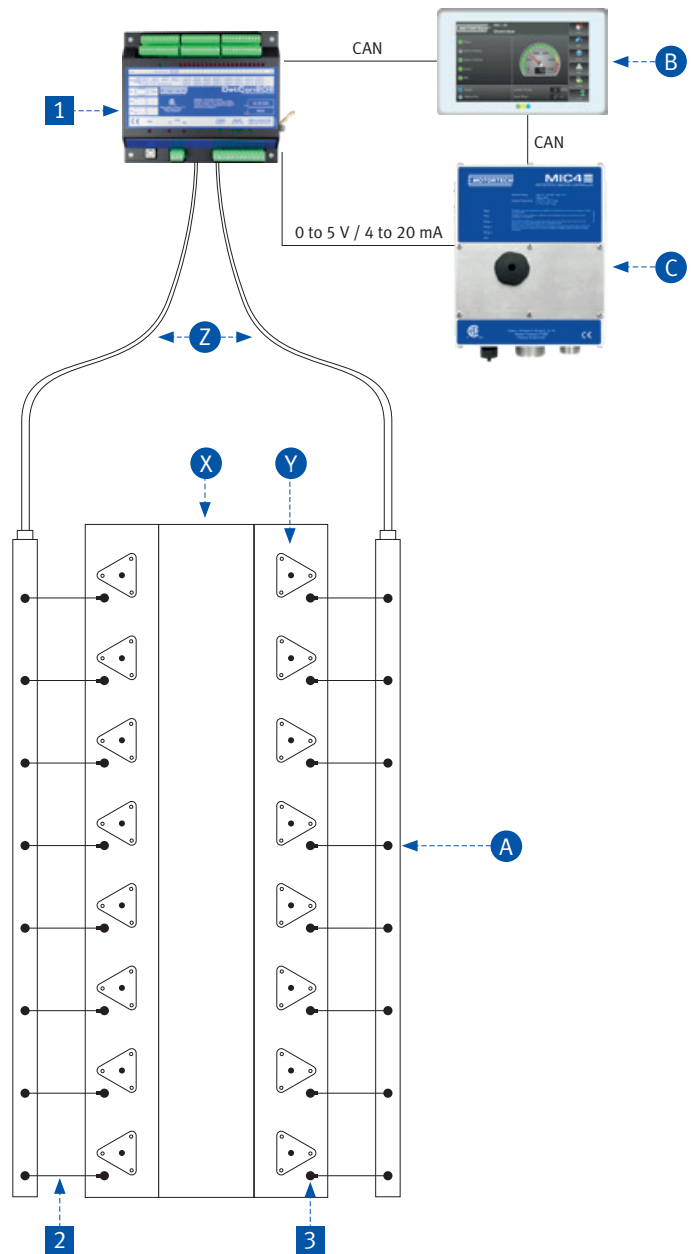
System Enhancement

- B PowerView3 – HMI module
- C MIC4 – Ignition controller

Description

- X Engine
- Y Cylinder
- Z Harness to connect the detonation wiring rails and the control unit

* Shielded and unshielded versions available.



Gas Engine Control Systems

1 DetCon20 Control Unit

The gas engine operators are calling for increased power output from their engines. More load means higher temperatures, pressures and tougher operation. This mostly ends in catastrophic engine damages due to detonation or pre-ignition.

As MOTORTECH has proven for years, detonation can be detected professionally with the DetCon20. Single cylinder sensors constantly monitor the sound level of the combustion chamber. Once the controller detects soft detonation on one of the sensors (this is a specific stage before real detonation occurs), several steps will take place:

- Alarm signal turns on
- Ignition retard by 0 to 5 V or 4 to 20 mA analog output
- If this action does not cure the detonation, the load reduction output will be activated.
- If the load drop does not stop the engine from detonating the engine STOP output will be activated.



3 Detonation Sensor

Can be installed on the cylinder head screw. Measures the detonation signal and transfers it to the controller.



A AlphaRail Wiring Rail System for Detonation Control

MOTORTECH stainless steel, vibration resistant rail assembly will withstand any harsh environment commonly found in the oil & gas industry. The proven design is made for engine manufacturers and the global aftermarket. Do not go Low-Tech and take the risk of engine down time because of equipment being under repair. Eliminate the need for constant rewiring, connector exchanges or straightening out weak and bent aluminum wiring rails.

- Made of stainless steel
- Rigid military style connectors
- Rails are filled with special foam to ensure that all wires are separated from ground and will not vibrate
- Water proof design – built to last in uncovered environment
- Ignition rails can be used for shielded and unshielded applications.
- Due to base rail structure easy for stocking
- Quick service access with quick-disconnect connections



B PowerView3 Detonation Control Visualization

The operating data of the DetCon detonation control system will be completely visualized via HMI module (Human Machine Interface). The overview screen shows the relevant information as engine knocking, knock intensity and status for activated load reduction or emergency shutdown of engine.

The control keys guarantee simple navigation through the different display pages and menus. All in all the PowerView3 HMI module is also able to provide error diagnostics on-site without requiring a laptop!



■ Gas Engine Control Systems

ALL-IN-ONE Generator & CHP Control System



- **ALL-IN-ONE.NTC controller**
- Universal gen-set controller – incl. AFR control ¹⁾ and AirGate® technology
- Support of engines with ECU (Electronic Control Unit)
- Complete integrated gen-set solution incorporating built-in PLC and signal sharing via CAN bus
- Many communication options
- Gen-set performance log for easy problem tracing
- Air/Fuel Ratio function for lean burn gas engines (requires additional hardware dongle)

P/N 63.50.104

¹⁾ Requires hardware dongle P/N 63.50.061 or 63.50.062 for activation.



- **ALL-IN-ONE.Vision8 display**
- 8.0 inch color display unit for ALL-IN-ONE.NTC controller
- Resolution of 800 x 600 pixels
- Fast and intuitive navigation
- Adaptive and color alarm list
- Configurable soft key buttons
- Large history screen

P/N 63.50.101



- **Hardware dongle for ALL-IN-ONE.NTC controller**
- Enables single island or single parallel with mains operation
- Air/fuel ratio function for lean burn gas engines

P/N 63.50.061

Gas Engine Control Systems



ALL-IN-ONE Generator & CHP Control System

Optional to P/N 63.50.061

- **Hardware dongle for ALL-IN-ONE.NTC controller**
- Enables multiple island parallel or multiple parallel with mains operation
- Power management operation via CAN bus
- Digital load sharing
- Digital VAr sharing
- Optimizing number of running engines: kW, kVA, load percentage or running hours based power management
- Air/fuel ratio function for lean burn gas engines



P/N 63.50.062

- **Mini-ALL-IN-ONE controller**
- Universal controller for small gen-sets – incl. AFR control ²⁾
- Support of engines with ECU (Electronic Control Unit)
- Complete integrated gen-set solution and signal sharing via CAN bus
- Many communication options
- Gen-set performance log for easy problem tracing
- **For applications up to 75 kWel only**



P/N 63.50.082

²⁾ Requires hardware dongle P/N 63.50.085 for activation.

- **Hardware dongle for Mini-ALL-IN-ONE**
- Enables single island or single parallel with mains operation
- Air/fuel ratio function for lean burn gas engines
- **For applications up to 75 kWel only**



P/N 63.50.085

Gas Engine Control Systems

Accessories / Extension Modules



- **Analog input module**
- 8 configurable analog input channels
- 1 impuls/RPM input channel
- Supported sensors:
 - Pt100, Pt1000
 - Ni100, Ni1000
 - 0 to 20 mA
 - ± 20 mA
 - 0 to 250 Ω , 0 to 2400 Ω , 0 to 10 k Ω
 - ± 1 V DC, 0 to 10 V DC, 0 to 5 V DC
- Connection via CAN bus
- Up to 10 modules can be connected to 1 controller

P/N 63.50.092



- **Analog input module for thermocouples only**
- 8 configurable analog input channels
- 1 impuls/RPM input channel
- Supported sensors:
 - Thermocouple J, K, L ($^{\circ}\text{C}$)
 - Thermocouple J, K, L ($^{\circ}\text{F}$)
- Cold junction compensation is available
- Connection via CAN bus

P/N 63.50.093



- **Binary inputs/outputs and analog outputs module**
- 8/16 binary input channels
 - Pull up, pull down options
- 8/0 binary output channels
 - Low side, high side options
 - Use of outputs as inputs possible
- 2 analog output channel
 - Voltage: 0 to 10 V DC
 - Current: 0 to 20 mA
 - PWMs

P/N 63.50.118

Accessories / Extension Modules

- **Analog input module**
- 8 configurable analog inputs
- Accepts 2 or 3 wire resistive, current and voltage senders
- Connection via CAN bus
- Up to 10 modules can be connected to 1 controller

P/N 63.50.002

- **Analog/binary input/output module**
- 8 configurable binary inputs and 8 configurable binary open collector outputs
- 4 configurable analog inputs and 1 analog output
- LEDs indicate the state of binary input/output
- Connection via CAN bus
- Up to 4 units can be connected to 1 controller

P/N 63.50.007

- **AVR interface module**
- 4 kV electric insulation between controller and AVR
- DIN rail design

P/N 63.50.011

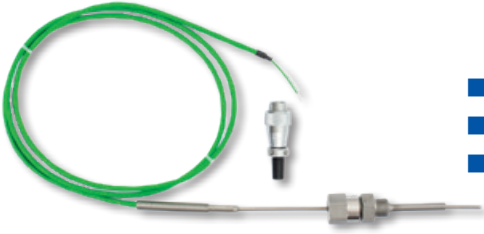
- **Power supply transformers for AVR interface module**

P/N 63.50.010-100 100-120 VAC, 50-60 Hz

P/N 63.50.010-230 230-480 VAC, 50-60 Hz



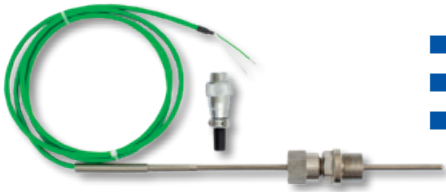
Thermocouples



- **Thermocouple**
- Type K (NiCrNi), 180°
- For 12V190 series

P/N M8604-0021-0060

Equivalent to:
SHENGLI® P/N EPN09.350



- **Thermocouple**
- Type K (NiCrNi), 180°
- For 12V190 series

P/N M8604-0022-0060

Equivalent to:
SHENGLI® P/N EPN09.370

Coolant Filtration

- **Bypass filters with stainless steel filter elements**
- Cleans and maintains coolant system from rust and contaminants
- Increases water pump life cylinder head efficiency
- Stainless steel filter elements can be cleaned – NO WASTE
- Easy to install and to service – Ideal for retrofitting

P/N 25.00.009-50

- 50 micron element
- 9 inch length
- Flow indicator

P/N 25.00.009-50-30

- 50 micron element
 - 9 inch length
 - Flow indicator
 - 30 inch stand
-



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All Products at a Glance!

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MOTORTECH GmbH

Hogrevestr. 21-23
29223 Celle
Germany
Phone: +49 (5141) 93 99 0
Fax: +49 (5141) 93 99 99
www.motortech.de
sales@motortech.de

MOTORTECH Americas, LLC

1400 Dealers Avenue, Suite A
New Orleans, LA 70123
USA
Phone: +1 (504) 355 4212
Fax: +1 (504) 355 4217
www.motortechamericas.com
info@motortechamericas.com

MOTORTECH Shanghai Co. Ltd.

Room 1018 Enterprise Square,
No. 228 Meiyuan Road,
Zhabei District, 200070 Shanghai
China
Phone: +86 (21) 6380 7338
www.motortechshanghai.com
info@motortechshanghai.com

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