GVM142 Global Vehicle Motor

Permanent Magnet (PMAC) Motors and Generators for Vehicle Applications

Integrated SMART Electrification Connected Efficient

Parker

ENGINEERING YOUR SUCCESS.

WARNING — USER RESPONSIBILITY

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Global Vehicle Motor - GVM142

Overview

Description

PMAC servomotors offer the best solution to meet the requirements of vehicle duty performance. The torque density and speed capabilities of Parker Permanent Magnet AC motors (PMAC) combined with a voltage-matched inverter provide the speed and torque required to achieve breakthrough performance in a variety of vehicle platforms.
The GVM is a powerful choice for both on and off-road vehicles, engineered mainly for Electro-hydraulic Pumps (EHP) and auxiliary applications.
The GVM motor line has been designed to be used in a wide variety of vehicle applications including; construction vehicles, refuse truck, city buses, street sweeper, motorcycles and scooters, light commercial vehicles and watercraft.

Features

- High efficiency
- Compactness (High power density)
- Can be used either as motor or generator
- Operating voltages available from 24 to 800 VDC
- Rare earth magnets allow high temperature operation
- Patented water cooling system

Typical Applications

- Electric motors/generators for hybrid applications
- Electric motors for motorbikes, scooters…
- Electro-hydraulic pumps for cylinders
- Auxiliary applications as fan/compressors for air conditionning

Technical Characteristics - Overview

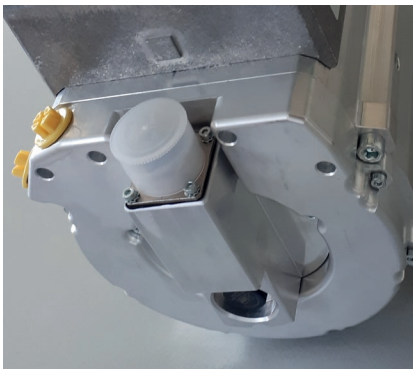
Motor type	Permanent Magnet synchronous motor
Magnet materials	Rare earth magnets
Number of poles	12
Batterry voltage	24 to 800 VDC
Power range	up to 26.3 kW (continuous)
Torque range	up to 85 Nm (peak)
Speed range	up to 9750 min^{-1}
Ambient temperature[1]	liquid cooled: -40…+120 °C natural convection: -40…+65 °C
Storage temperature[1]	-40…+120 °C
Sensor	Resolver or SinCos encoder
Insulation of the stator winding	Class H with potting
Protection	IP67 as standard IP6K9K on request[2]
Thermal protection	1 PTC probes and 1 KTY84-130 sensor
Shaft end	Female SAE A spline shaft, other possibilities on request
Connections	Terminal box (flying cables for kits); connector for feedback
Marking	CE

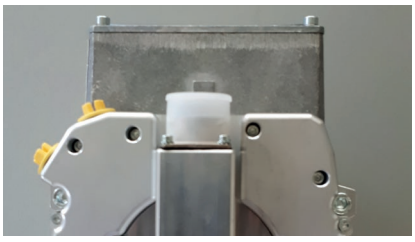
[1] With resolver as feedback
[2] When a pump is assembled on the front of the motor (with its own seal) the combination complies with IP6K9K protection
Note: In case of axial or radial load on the shaft, please consult the acceptable limits on the GVM technical manual.

Overview

Cooling System

- Enables high power density
- Advised cooling liquid: Water/Glycol 50% for the best compromise
- Circular stator comprising the cooling system can be inserted as a kit in any circular housing (Parker or customer)
- Natural convection cooling alternative available for low power / low speed





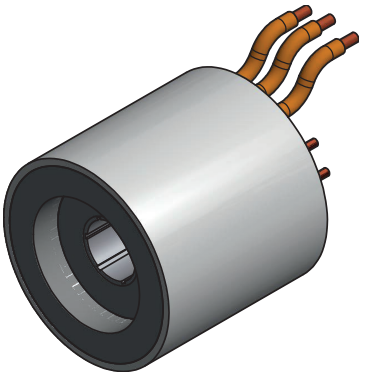
Rugged Design

- Designed to be shock-proof, vibration-proof, salt spray resistant
- Gore vent: to avoid condensation in case of sudden T° variation or during storage at low T°
- Ambient T°: -40 °C to +120 °C (liquid cooling)
- IP67 standard; IP6K9K on request

GVK Motors:

High customisation level requested. Only for high volumes and for OEM applications

- Available on request as a potted circular stator including the cooling system
- Provides the customer with a bespoke and integrated mechanical design
- GVK range has the same electrical characteristics as GVM range
- Parker is able to offer support in the integration of GVM kits, please contact us



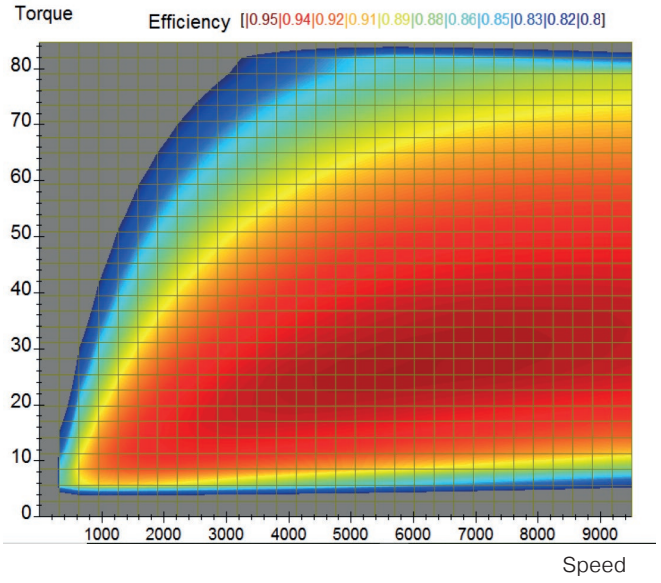
Typical Efficiency Maps

GVM Motors: an efficient range.

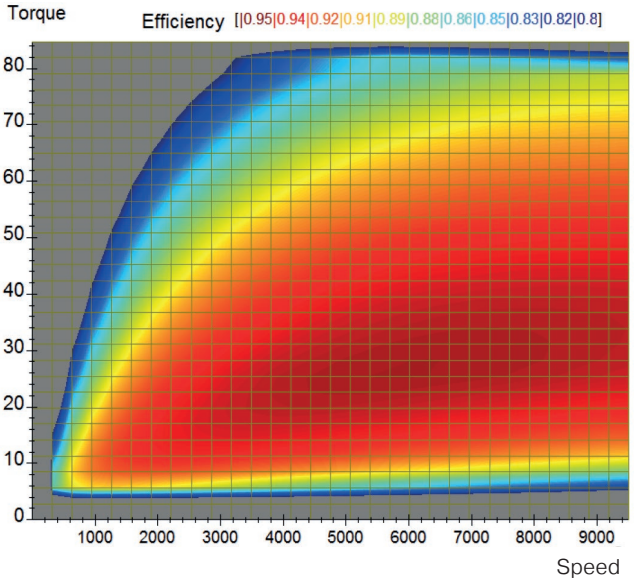
The PMAC efficiency is far higher than induction motor one of the same power range.

Only when using the best component technology and optimal design characteristics do traction motors/generators and controllers minimize losses both during motoring and power generation - increasing vehicle range.
Variable speed system allows higher efficiency even at low speed.

GVM142-100 in Motor operation mode



GVM142-100 in Generator operation mode



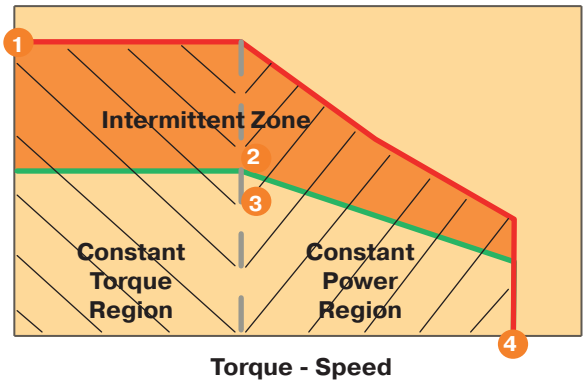
Motor Performance definitions

GVM Series motors are designed to meet the power requirements in a wide variety of vehicle applications. The GVM has the ability to operate at different battery voltages without loss of power.

- From 24 to 800 VDC
- Numerous rotor lengths
- Multiple winding configurations per length

By selecting the appropriate voltage, rotor length and winding variation, the following parameters can refined to match the vehicle's specific performance requirements:

- Peak torque
- Peak power
- Rated torque
- Rated speed
- Rated power
- Maximum speed



Torque - Speed

Parameters	Battery DC Voltage [V]	Rated Torque Mn [Nm]	Rated Power Pn [kW]	Rated Current In [Arms]	Rated Speed Nn [min^{-1}]	Peak Torque Mp [Nm]	Peak Power Pp [kW]	Peak Current Ip [Arms]	Maximum Speed Nmax [min^{-1}]
		2			3	1			4

Technical Characteristics

GVM142 Low Voltage Windings - Natural Convection Cooling

Motor	Battery DC Voltage [V]	Rated Torque Mn [Nm]	Rated Power Pn [kW]	Rated Current In [Arms]	Rated Speed Nn [min^{-1}]	Peak Torque Mp [Nm]	Peak Power Pp [kW]	Peak Current Ip [Arms]	Maximum Speed Nmax [min^{-1}]
GVM142-050-DPN	24	8.99	3.03	125	3220	40	7.2	691.1	3800
GVM142-050-GPN	36	6.74	3.18	87.1	4500	40	10.4	625.3	4900
GVM142-050-MPN	48	6.33	3.12	64	4700	40	10.9	486.4	5200
GVM142-050-YPN	72	6.74	3.18	42.6	4500	40	10.4	305.4	5000
GVM142-050-ZPN	80	6.12	3.08	37.2	4800	40	11.1	291.8	5200
GVM142-050-EQN	96	6.54	3.15	31.2	4600	40	10.6	230.4	4950
GVM142-050-NQN	120	7.87	3.22	26.1	3900	40	9.0	162.1	4400
GVM142-075-DPN	24	14.3	2.84	129	1890	62	6.7	715.4	2200
GVM142-075-DPN	36	9.36	3.43	87.5	3500	62	11.5	715.3	3500
GVM142-075-GPN	48	7.26	3.04	62.6	4000	62	14.3	647.1	4000
GVM142-075-YPN	72	10.8	3.52	44.3	3100	62	10.4	316.1	3100
GVM142-075-YPN	80	9.36	3.43	38.6	3500	62	11.7	316.1	3500
GVM142-075-ZPN	96	8.13	3.24	32.3	3800	62	13.6	302.0	3800
GVM142-075-EQN	120	8.13	3.24	25.5	3800	62	13.1	238.3	3800
GVM142-100-DPN	24	18.1	2.74	121	1440	85	6.9	742.6	1750
GVM142-100-DPN	36	14.8	3.57	101	2300	85	11.4	742.6	2700
GVM142-100-GPN	48	11.8	3.58	73.6	2900	85	14.2	671.9	3100
GVM142-100-YPN	72	15.5	3.49	46.3	2150	85	10.2	328.1	1350
GVM142-100-YPN	80	14.4	3.61	43.2	2400	85	11.5	328.1	2650
GVM142-100-ZPN	96	12.3	3.62	35.8	2800	85	13.5	313.5	3000
GVM142-100-DQN	120	11.8	3.58	29.2	2900	85	14.1	266.2	3100

GVM142 Low Voltage Windings - Liquid Cooling

Motor	Battery DC Voltage [V]	Rated Torque Mn [Nm]	Rated Power Pn [kW]	Rated Current In [Arms]	Rated Speed Nn [min^{-1}]	Peak Torque Mp [Nm]	Peak Power Pp [kW]	Peak Current Ip [Arms]	Maximum Speed Nmax [min^{-1}]
GVM142-050-MPW	24	18.4	3.47	178	1800	40	4.6	486.7	2700
GVM142-050-MPW	36	18.2	5.73	177	3000	40	7.9	486.7	4500
GVM142-050-MPW	48	18.1	7.94	175	4200	40	11.0	486.7	6300
GVM142-050-MPW	72	17.6	12	172	6500	40	17.0	486.6	9750
GVM142-050-MPW	80	17.4	13.1	171	7200	40	18.9	486.6	9500
GVM142-050-YPW	96	17.8	10.1	109	5400	40	14.2	305.6	8100
GVM142-050-ZPW	120	17.6	11.8	103	6400	40	16.7	292.0	9500
GVM142-075-MPW	24	29	3.39	182	1110	62	4.4	503.6	1650
GVM142-075-MPW	36	29	5.81	183	1910	62	7.8	503.5	2850
GVM142-075-MPW	48	29	7.9	183	2600	62	10.9	503.5	3900
GVM142-075-MPW	72	28.5	12.3	181	4100	62	17.0	503.5	6150
GVM142-075-MPW	80	28.3	13.9	180	4700	62	19.1	503.5	7050
GVM142-075-MPW	96	28	16.4	178	5600	62	23.1	503.5	8400
GVM142-075-MPW	120	27.4	19.8	175	6900	62	28.4	503.5	9500
GVM142-100-MPW	24	40	3.38	187	806	85	3.9	523.0	1200
GVM142-100-MPW	36	40	5.88	187	1400	85	7.6	523.0	2100
GVM142-100-MPW	48	39.9	8.15	187	1950	85	10.7	523.0	2925
GVM142-100-MPW	72	39.4	12.4	185	3000	85	16.9	523.0	4500
GVM142-100-MPW	80	39.2	14	185	3400	85	19.0	523.0	5100
GVM142-100-MPW	96	38.8	17.1	183	4200	85	23.2	523.0	6300
GVM142-100-MPW	120	38.2	20.8	180	5200	85	28.6	523.0	7800

GVM Stator connected to a heat-exchange surface at 60 °C without water cooling
(Characteristics are given for an optimal drive / motor association without any limitation coming from the drive)
These products without liquid cooling are typically dedicated to EHP due to the low speed level available.

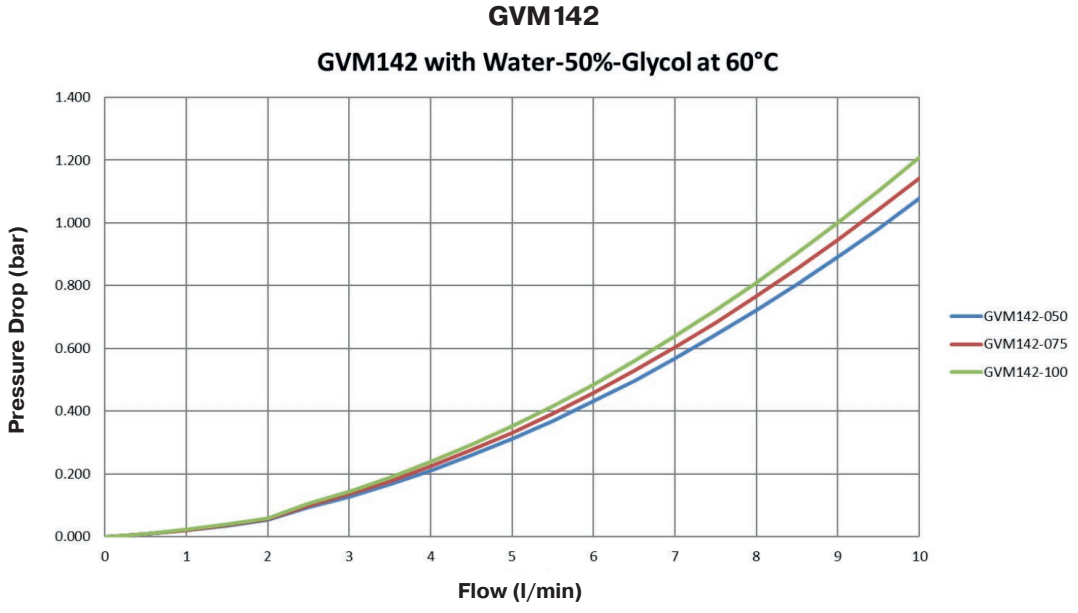
GVM Input cooling liquid at 65 °C (Characteristics are given for an optimal drive / motor association without any limitation coming from the drive) / (for alternative cooling temperatures please contact us)

GVM142 High Voltage windings - Liquid Cooling

Motor	Battery DC Voltage [V]	Rated Torque Mn [Nm]	Rated Power Pn [kW]	Rated Current In [Arms]	Rated Speed Nn [min^{-1}]	Peak Torque Mp [Nm]	Peak Power Pp [kW]	Peak Current Ip [Arms]	Maximum Speed Nmax [min^{-1}]
GVM142-050-XQW	320	17.6	12.3	39	6700	40	17.3	110.4	9500
GVM142-050-DRW	400	17.6	12.2	30.7	6600	40	17.1	87.0	9500
GVM142-050-RRW	640	17.7	11.5	18.1	6220	40	16.1	51.1	8890
GVM142-075-NQW	320	27.6	18.5	58.8	6400	62	25.9	167.8	9500
GVM142-075-SQW	400	27.5	19.3	48.9	6700	62	27.2	140.1	9500
GVM142-075-XQW	480	27.5	19	39.9	6600	62	26.6	114.2	9500
GVM142-075-ERW	640	27.6	18.7	29.5	6500	62	26.3	84.4	9500
GVM142-100-EQW	320	37	26.3	83.1	6800	85	37.2	247.7	9500
GVM142-100-NQW	400	37.6	23.6	59.4	6000	85	32.8	174.3	9000
GVM142-100-SQW	480	37.6	23.6	49.6	6000	85	32.9	145.6	9000
GVM142-100-ZQW	640	37.5	23.8	37.2	6050	85	33.1	109.5	8570

GVM Input cooling liquid at 65 °C (Characteristics are given for an optimal inverter / motor association without any limitation coming from the drive)
(for alternative cooling temperatures please contact us)

Liquid Cooling Pressure Drop

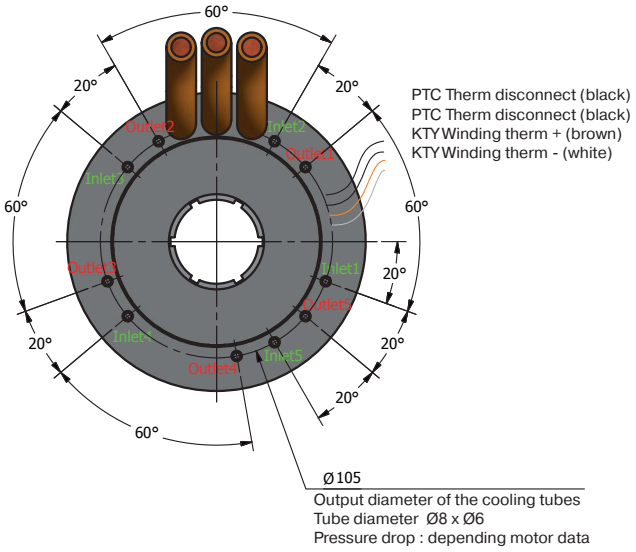


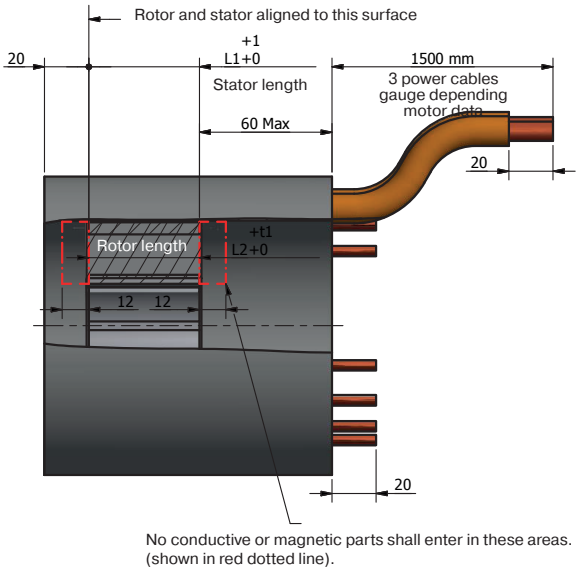
Please refer to the motor datasheet or technical manual for more information (PVD3668).
For other types of cooling liquid thank you to consult us.

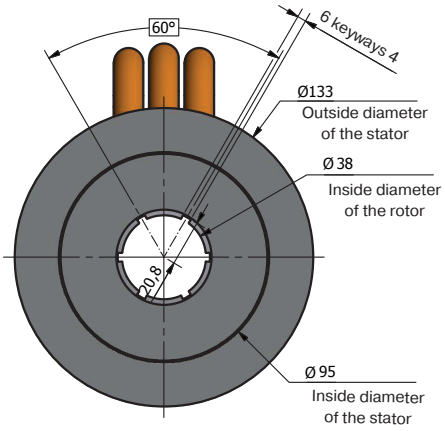
Dimensions

GVK142 (Kit Version) *

High customisation level requested. Only for high volumes and for OEM applications







Motor size	L1 [mm]	L2 [mm]	t1	Weight [kg]
GVK142-075	75	75	1	8.5
GVK142-100	100	100	1	10.5
GVK142-150	150	150	1.5	14.5

WARNING

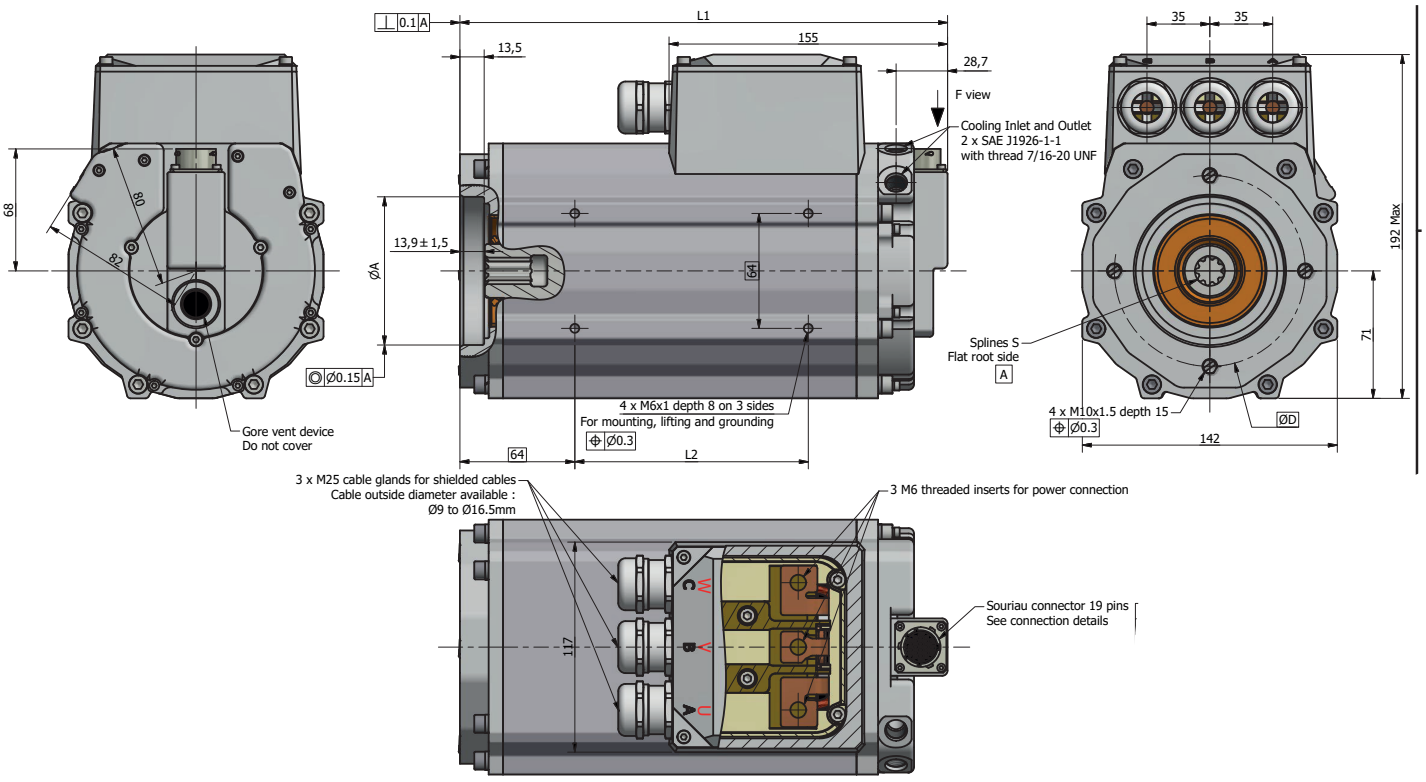
The motor has to be shrinked in the customer housing by Parker
Parker will support the customer to determine part dimensions

To have the pressure drop given by Parker:
Connect all of the Inlet in // to the cooling system input
Connect all of the Outlet in // to the cooling system output

* Outside dimensions are subject to change depending on the winding symbol. For further information, please contact your local Parker representative.

Standard Version (EHP Applications)

GVM142 (SAE A)



Motor size	L1 [mm]	L2 [mm]	Weight [kg]	SAE A
GVM142-050	225 max	80	16	x
GVM142-075	250 max	105	18.5	x
GVM142-100	275 max	130	20.5	x

Front interface data			
SAE choice	**ØA**	**E**	**S**
SAE A	Ø82.55 G7	25	SAE A 9T 16/32 DP

Cable and Cooling Accessories

Sensor cable

Description	Order code *
Connector + sensor cable / SinCos(1)	**CBFSC0H0-SRX-000-xxx0-00**
Connector + sensor cable / Resolver	**CBFRE0H0-SRX-000-xxx0-00**

* These 3 digits (xxx) indicate cable length in meters : 001, 002, 003 or 004 meters as standard.

(1) In case of SinCos encoder, take care to connect the cable shield to the vehicle chassis. The motor housing must be at the same potential than the drive body.

GVM Hoses

We recommend to use the Parker Multipurpose Transfer Hose - Oilpress N/L 20-30 :

Part Number	I.D. (mm)	O.D. (mm)	Max. Working Pressure MPa	psi	bar	Weight kg/m	min. Bend Radius mm	in Stock
OILPRESS N/L 20								
IH30832000/40	6	12	2.0	300.0	20	0.12	25	Y
IH30832001/40	8	14	2.0	300.0	20	0.15	35	Y
IH30832002/40	10	17	2.0	300.0	20	0.21	40	Y
IH30832003/40	13	20	2.0	300.0	20	0.26	55	Y
IH30832004/40	16	23	2.0	300.0	20	0.31	65	Y
IH30832005/40	19	28	2.0	300.0	20	0.47	80	Y
IH30832006/40	25	36	2.0	300.0	20	0.74	100	Y

GVM Fittings

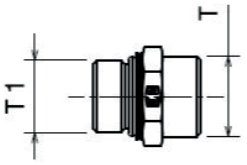
To complete your installation some additional components like hose fittings, connectors, and hoses may be required. While we do not provide these items, your local Parker hose distributor can assist. Find one on www.parker.com.

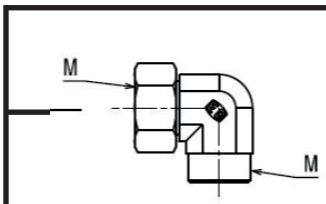
Coolant Connections

GVM142 : Coolant inlet / outlet are ORB-4 SAE J1926-1 with thread 7/16-20 UNF
We advise to use the male stud, fittings and hose as follow :

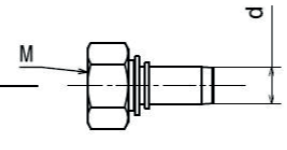
For EO 24° cone end (DIN 3861 / ISO 8434-1) :

GVM Fittings			
Motor	P/N Fitting	T1	T
GVM142	GE10L7/16UNFOMDCF	7/16-20 UNF-2A	M16x1,5

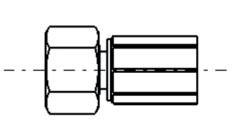




90° Elbow Fitting	
P/N	M
EW10LOMDCF	M16x1,5



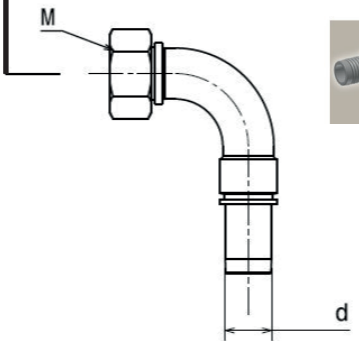
Or



Hose Fitting 47 series		
P/N	M	d
KCA47-10-5	M16x1,5	7,9

Hose Fitting 56 series		
P/N	M	d
1CA56-10-5	M16x1,5	7,9

Nota : use with tube clamp not include



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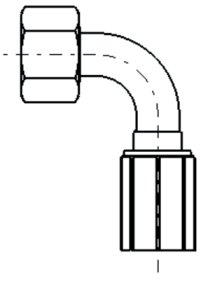

90° Elbow Hose Fitting 47 series		
P/N	M	d
KCF47-10-5	M16x1,5	7,9

90° Elbow Hose Fitting 56 series		
P/N	M	d
1CF56-10-5	M16x1,5	7,9

Nota : use with tube clamp not include

Order Code

	1	2	3	4	5	6	7	8	9	10	11
Order example	**GVM**	**142**	**100**	**AA**	**W**	**A**	**A**	**B**	**PA**	**1**	**E**

1	**Motor series**	
	GVM	Global Vehicle Motor
	GVK	Global Vehicle Kit Motor (on request)
2	**Frame size (outer width)**	
	142	142 mm
3	**Stack length***	
	050	data see chapter "Technical Characteristics"
	075	
	100	
4	**Winding symbol**	
	....	see motor tables
5	**Cooling system**	
	N	Natural convection
	W	Liquid cooling (please contact us for flow & cooling temperature data)

6	**Feedback**	
	A	Resolver (standard 2 poles)
	S	Sin/Cos RM22A (low voltage applications)
	0	No feedback sensor
7	**Thermal switch**	
	A	PTC
8	**Thermal sensor**	
	B	Equivalent to KTY84-130 thermistor
9	**Interface**	
	PA	EHP mount, SAE A, 2 holes
	00	Kit version
10	**Power connection**	
	1	Terminal box
	2	Flying cables (kit version only)
11	**Options**	
	G	Global (standard motor)
	E	Europe (custom motor)

* "Technical Characteristics" (page 8)

Parker's Motion & Control Technologies

At Parker, we're guided by a relentless drive to help our customers become more productive and achieve higher levels of profitability by engineering the best systems for their requirements. It means looking at customer applications from many angles to find new ways to create value. Whatever the motion and control technology need, Parker has the experience, breadth of product and global reach to consistently deliver. No company knows more about motion and control technology than Parker. For further info call 00800 27 27 5374

Aerospace

Key Markets

Aftermarket services
Commercial transports
Engines
General & business aviation
Helicopters
Launch vehicles
Military aircraft
Missiles
Power generation
Regional transports
Unmanned aerial vehicles

Key Products

Control systems & actuation products
Engine systems & components
Fluid conveyance systems & components
Fluid metering, delivery & atomization devices
Fuel systems & components
Fuel tank inerting systems
Hydraulic systems & components
Thermal management
Wheels & brakes

Climate Control

Key Markets

Agriculture
Air conditioning
Construction Machinery
Food & beverage
Industrial machinery
Life sciences
Oil & gas
Precision cooling
Process
Refrigeration
Transportation

Key Products

Accumulators
Advanced actuators
CO_2 controls
Electronic controllers
Filter driers
Hand shut-off valves
Heat exchangers
Hose & fittings
Pressure regulating valves
Refrigerant distributors
Safety relief valves
Smart pumps
Solenoid valves
Thermostatic expansion valves

Electromechanical

Key Markets

Aerospace
Factory automation
Life science & medical
Machine tools
Packaging machinery
Paper machinery
Plastics machinery & converting
Primary metals
Semiconductor & electronics
Textile
Wire & cable

Key Products

AC/DC drives & systems
Electric actuators, gantry robots & slides
Electrohydrostatic actuation systems
Electromechanical actuation systems
Human machine interface
Linear motors
Stepper motors, servo motors, drives & controls
Structural extrusions

Filtration

Key Markets

Aerospace
Food & beverage
Industrial plant & equipment
Life sciences
Marine
Mobile equipment
Oil & gas
Power generation & renewable energy
Process
Transportation
Water Purification

Key Products

Analytical gas generators
Compressed air filters & dryers
Engine air, coolant, fuel & oil filtration systems
Fluid condition monitoring systems
Hydraulic & lubrication filters
Hydrogen, nitrogen & zero air generators
Instrumentation filters
Membrane & fiber filters
Microfiltration
Sterile air filtration
Water desalination & purification filters & systems

Fluid & Gas Handling

Key Markets

Aerial lift
Agriculture
Bulk chemical handling
Construction machinery
Food & beverage
Fuel & gas delivery
Industrial machinery
Life sciences
Marine
Mining
Mobile
Oil & gas
Renewable energy
Transportation

Key Products

Check valves
Connectors for low pressure fluid conveyance
Deep sea umbilicals
Diagnostic equipment
Hose couplings
Industrial hose
Mooring systems & power cables
PTFE hose & tubing
Quick couplings
Rubber & thermoplastic hose
Tube fittings & adapters
Tubing & plastic fittings

Hydraulics

Key Markets

Aerial lift
Agriculture
Alternative energy
Construction machinery
Forestry
Industrial machinery
Machine tools
Marine
Material handling
Mining
Oil & gas
Power generation
Refuse vehicles
Renewable energy
Truck hydraulics
Turf equipment

Key Products

Accumulators
Cartridge valves
Electrohydraulic actuators
Human machine interfaces
Hybrid drives
Hydraulic cylinders
Hydraulic motors & pumps
Hydraulic systems
Hydraulic valves & controls
Hydrostatic steering
Integrated hydraulic circuits
Power take-offs
Power units
Rotary actuators
Sensors

Pneumatics

Key Markets

Aerospace
Conveyor & material handling
Factory automation
Life science & medical
Machine tools
Packaging machinery
Transportation & automotive

Key Products

Air preparation
Brass fittings & valves
Manifolds
Pneumatic accessories
Pneumatic actuators & grippers
Pneumatic valves & controls
Quick disconnects
Rotary actuators
Rubber & thermoplastic hose & couplings
Structural extrusions
Thermoplastic tubing & fittings
Vacuum generators, cups & sensors

Process Control

Key Markets

Alternative fuels
Biopharmaceuticals
Chemical & refining
Food & beverage
Marine & shipbuilding
Medical & dental
Microelectronics
Nuclear Power
Offshore oil exploration
Oil & gas
Pharmaceuticals
Power generation
Pulp & paper
Steel
Water/wastewater

Key Products

Analytical Instruments
Analytical sample conditioning products & systems
Chemical injection fittings & valves
Fluoropolymer chemical delivery fittings, valves & pumps
High purity gas delivery fittings, valves, regulators & digital flow controllers
Industrial mass flow meters/controllers
Permanent no-weld tube fittings
Precision industrial regulators & flow controllers
Process control double block & bleeds
Process control fittings, valves, regulators & manifold valves

Sealing & Shielding

Key Markets

Aerospace
Chemical processing
Consumer
Fluid power
General industrial
Information technology
Life sciences
Microelectronics
Military
Oil & gas
Power generation
Renewable energy
Telecommunications
Transportation

Key Products

Dynamic seals
Elastomeric o-rings
Electro-medical instrument design & assembly
EMI shielding
Extruded & precision-cut, fabricated elastomeric seals
High temperature metal seals
Homogeneous & inserted elastomeric shapes
Medical device fabrication & assembly
Metal & plastic retained composite seals
Shielded optical windows
Silicone tubing & extrusions
Thermal management
Vibration dampening

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