



THE FUTURE OF DRIVELINE TECHNOLOGY

2019



OE/GSE Catalog

Shifters

Valve Bodies

Powertrain Electronics

- Factory New Transmissions
- Interchangeable Bellhousings



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Electronic transmissions can provide significant advantages over older hydraulic and hydrostatic transmissions, but their integration into the vehicle can initially appear complex and time consuming. After years of assisting vehicle manufacturers with designing and installing transmissions into drivelines, PCS has developed complete transmission packages that include everything needed for a well-engineered driveline solution. This simple solution allows the vehicle manufacturer to draw from PCS's expertise and focus on other vehicle aspects and manufacturing. A complete transmission solution includes much more than just a transmission and torque converter. All complete PCS packages include vent kit, dipstick, TCU, harness, flexplate, and more.

100% FACTORY NEW TRANSMISSIONS

At the core of every transmission package is a 100% factory new GM 4L70E transmission. Vehicle manufacturers select the bellhousing, valve body, and parking brake options that meet their needs. Contact PCS for remanufactured transmission options.

INTERCHANGEABLE BELLHOUSINGS

PCS transmission packages are available with bellhousings for common engine flywheel housings including C6, SAE4, and more.

PARKING BRAKE

The optional disc or drum parking brake mounts directly to the transmission. In disc brake applications, the caliper can be mounted in several positions providing clearance for transmission tunnels or exhaust. The cable can be configured for left hand or right hand connection to the disc brake caliper.

ENGINE ADAPTERS

Engine flywheel adapters are available for Deutz, Kubota, Perkins, Ford, Cummins, and more upon request.

WARRANTY

PCS offers a warranty for transmission packages used in validated installations. For more information regarding warranty and installation validation, please contact PCS.

Capabilities

	4LHD	4LHDX
ALL NEW – Produced using GM approved production processes and quality control	~	~
Unique valve body and spacer plate calibrations for the harsh, industrial market	~	\checkmark
Abuse Protection System (APS) Valve Body Assembly (patented) to prevent operator induced premature transmission and vehicle wear	× .	× .
Heat-treated stator shaft splines	~	~
258mm torque converter with lockup clutch	~	
300mm torque converter with lockup clutch		~
Induction and/or heat treated input/output shafts	~	 Image: A second s
Internal input speed sensor (Shift performance/control, Diagnostics)	~	~
Internal Mode Switch (IMS)	~	× .
Heavier-duty low/reverse roller clutch	~	~
7-plate 3-4 clutch	~	×
Heavy-duty, needle-type thrust bearings	~	~
Hardened reaction sun gear shell	~	 Image: A second s
Induction hardened turbine shaft/output splines		~
Output shaft includes process improvements for longer fatigue life		 Image: A second s
Five-pinion input and reaction gear sets		~

NOTE: PCS offers two models of the GM 4-speed, the 4LHD and 4LHDX. Both models are enhanced versions of the GM 4L60/70 transmissions that have been in production since 1993.





ABUSE PROTECTION VALVE BODY

The patented Abuse Protection System (APS) Valve Body Assembly prevents operator induced premature transmission and vehicle wear.

ABUSE Protection	Often times the operator causes the most damage to the transmission, reducing the service life and causing costly repairs and downtime. The PCS 4-speed abuse protection valve body protects the transmission by locking out reverse engagement until the vehicle is stopped and the engine is at idle. It also prevents "neutral drops" by only engaging the forward gears when the engine is at idle.
ELECTRONIC Range*	Eliminate the shift cable and shift the transmission electronically with a push of a button or movement of a lever. Driver inputs can be validated based on vehicle modes and conditions so the vehicle is operated within standard operating protocols. Electronic range also eliminates transmission failure due to an improperly adjusted shift cable.
INCHING*	The PCS inching valve body allows the operator to move the vehicle forward or backward in small increments from an operator's panel remotely mounted on the vehicle. This greatly reduces time when connecting to trailers or other equipment and makes the operation more efficient for one person.
*NOTE: GEN III valve bo	odies only.

Input and Output Options



INPUT OPTIONS

The configuration of the engine mounting face varies according to engine usage. The 4LHD/4LHDX currently supports five types of mounting faces including the C6, GM LS, SAE3, SAE4, and SAE5. Contact PCS for custom engine adaption options.

BELLHOUSINGS	
SAE4 Bellhousing	BEL2404
C6 Bellhousing	BEL2406
GM LS Bellhousing	BEL2403
ADAPTER KITS	
SAE4 to SAE3 Housing Adapter Kit	TRN8379
SAE5 Ring Kit - Standard Hardware	TRN8375
SAE5 Ring Kit - Metric Hardware	TRN8377
SAE4 to SAE5 Housing Adapter Kit	TRN8378



OUTPUT OPTIONS

Our current line of extension housings have been designed and tested for both new installation and re-powered industrial applications. All four of these options include crossmember mount locations rated for up to 200lbs. Parking brake options are available with the Ford C6 Replacement and Fixed Flange Output (FFO) extension housings. Contact PCS for 4WD and AWD transfer case options.

OUTPUT OPTIONS	
4LHD Disc Parking Brake - Fixed Flange Output	BRK2010
C6 Output	TRN8800
C6 Drum Brake Kit	TRN8805
GM 2WD Output	TRN8110
GM 4WD Output	TRN0101

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PART#	VALVE BODY	CONVERTER	BELLHOUSING	OUTPUT
4LHD TRANSMISSIONS				
TRN4240	GEN 2	GM 258mm	GM	2WD Slip Yoke
TRN4245	GEN 3	GM 258mm	GM	2WD Slip Yoke
TRN4242	GEN 2	GM 258mm	SAE4	2WD Slip Yoke
TRN4247	GEN 3	GM 258mm	SAE4	2WD Slip Yoke
TRN4261	GEN 2	C6 258mm	C6	2WD Slip Yoke
TRN4262	GEN 3	C6 258mm	C6	2WD Slip Yoke
TRN4440	GEN 2	GM 258mm	GM	4WD Output Shaft
TRN4445	GEN 3	GM 258mm	GM	4WD Output Shaft
TRN4442	GEN 2	GM 258mm	SAE4	4WD Output Shaft
TRN4447	GEN 3	GM 258mm	SAE4	4WD Output Shaft
TRN4461	GEN 2	C6 258mm	C6	4WD Output Shaft
TRN4462	GEN 3	C6 258mm	C6	4WD Output Shaft
TRN4263	GEN 2	GM 258mm	GM	C6 Replacement
TRN4264	GEN 3	GM 258mm	GM	C6 Replacement
TRN4266	GEN 2	C6 258mm	SAE4	C6 Replacement
TRN4267	GEN 3	C6 258mm	SAE4	C6 Replacement
TRN4260	GEN 2	GM 258mm	C6	C6 Replacement
TRN4265	GEN 3	GM 258mm	C6	C6 Replacement
TRN4340	GEN 2	GM 258mm	GM	Fixed Flange Output
TRN4345	GEN 3	GM 258mm	GM	Fixed Flange Output
TRN4342	GEN 2	GM 258mm	SAE4	Fixed Flange Output
TRN4347	GEN 3	GM 258mm	SAE4	Fixed Flange Output
TRN4361	GEN 2	C6 258mm	C6	Fixed Flange Output
TRN4362	GEN 3	C6 258mm	C6	Fixed Flange Output

GSE



PCS Fixed Flange Output Extension Housing

PART#	VALVE BODY	CONVERTER BELLHOUSING		OUTPUT
4LHDX TRANSM	ISSIONS			
TRN4255	GEN 2	GM 300mm	GM	2WD Slip Yoke
TRN4257	GEN 3	GM 300mm	GM	2WD Slip Yoke
TRN4230	GEN 2	GM 300mm	SAE4	2WD Slip Yoke
TRN4231	GEN 3	GM 300mm	SAE4	2WD Slip Yoke
TRN4430	GEN 2	GM 300mm	SAE4	4WD Output Shaft
TRN4431	GEN 3	GM 300mm	SAE4	4WD Output Shaft
TRN4455	GEN 2	GM 300mm	GM	4WD Output Shaft
TRN4457	GEN 3	GM 300mm	GM	4WD Output Shaft
TRN4330	GEN 2	GM 300mm	SAE4	Fixed Flange Output
TRN4331	GEN 3	GM 300mm	SAE4	Fixed Flange Output
TRN4355	GEN 2	GM 300mm	GM	Fixed Flange Output
TRN4357	GEN 3	GM 300mm	GM	Fixed Flange Output

NOTE: Contact PCS for remanufactured transmission options.





FLYWHEEL ADAPTION KITS

Having the torque converter correctly spaced with the transmission pump is critical for both optimal functionality and the prevention of permanent damage to the transmission. To adapt to a wide variety of flywheel and bellhousing combinations, PCS uses flywheel adaption kits to mate the 4LHD/4LHDX flexplate and torque converter with the engine's flywheel.

PART#	DIM "A" - 4LHD 258mm	DIM "A" - 4LHDX 300mm	FLYWHEEL	BOLT PITCH	DIM "B" - BOLT DEPTH
TRN8205	83.4	94.4	FORD DSG	M8x1.25	12.3
TRN8222	53.8	64.8	SAE10	SEE NOTE	SEE NOTE
TRN8216	51.9	62.9	SAE10	3/8-16"	9.5
TRN8224	39.4	50.4	SAE10	SEE NOTE	SEE NOTE
TRN8310	36.9	47.9	SAE10	3/8-24"	22.4
TRN8217	36.8	47.8	SAE10	3/8-16"	7.2
TRN8218	30.4	41.4	SAE7.5	5/16-18"	15.9
TRN8220	28.5	39.5	SAE7.5	5/16-18"	12.7
TRN8225	25.1	36.1	SAE10	SEE NOTE	SEE NOTE
TRN8412	23.1	34.1	SAE10	M10x1.5	12.3
TRN8226	15.0	26.0	SAE10	SEE NOTE	SEE NOTE
TRN8219	12.9	23.9	SAE10	M10x1.25	12.3
TRN8215	12.2	23.2	BBS/SAE5	M10x1.25	15.0
TRN8221	10.4	21.4	SAE10	SEE NOTE	SEE NOTE
TRN8223	3.8	14.8	BBS/SAE5	M10x1.25	15.0
TRN8200	1.5	12.5	SAE10	M10x1.50	12.3

DIM "A" and DIM "B" measurements shown in millimeters (mm).

NOTE: Before ordering any of the kits above, it is critical to check both the distance between the flywheel and flywheel housing mating faces as well as the bolt threads and depths. Some kits do not include flywheel mating hardware to avoid this confusion. Hardware available separately.

4LHD/4LHDX TRANSMISSIONS Parking Brake

Due to high vehicle and trailer GVWs, the transmission's internal parking pawl is not utilized. Instead, parking brakes have been incorporated into the rear wheels or differential input. With our drum and disc parking brake options we can accommodate common driveshaft lengths, common cable inputs, existing transmission crossmembers, driveshaft upgrades, and modernized brake-apply systems all with an improved factor of safety designed specifically for GSE vehicles of all sizes.

DRUM BRAKE

This kit is a direct drop in replacement for the Ford C6 Drum Brake kit. A complete package requires both the transmission (extension housing included) and this kit (with drum housing, yoke, and drum brake components). Contact PCS for kit options without the drum.

C6 Replacement Drum Parking Brake Kit	TRN8805
C6 Replacement Brake Cable Bracket Kit	TRN7088



SPACER KIT

Our new extension housing (FFO) has undergone extensive development and testing to improve the maintainability, driveshaft angle, and longevity of the driveline. Utilizing a four bolt flange driveshaft interface our output is 4.2" shorter than previous C6 designs. This spacer is available for any transmission where the mounted parking brake is not necessary.

	- · · - · · · ·	
Fixed Flange	Output Spacer Kit	

BRK2021



MECHANICAL DISC PARKING BRAKE

Using a MICO[®] mechanical caliper and an easily adjustable linkage, this transmission mounted driveshaft parking brake is capable of 2100 N*m of driveshaft holding torque before differential reduction and tire size.

Mechanical Disc Parking Brake Kit (Right Hand)	BRK2050
Mechanical Disc Parking Brake Kit (Left Hand)	BRK2052



ELECTRIC DISC PARKING BRAKE

Capable of being commanded or automatically applied, this electronically controlled caliper guarantees a safe working environment for any operator, technician, and equipment nearby. This unit is fully programmable to acknowledge any desired inputs such as Engine-Off or Parking-Brake-Switch-Applied.

Electric Disc Parking Brake Kit

BRK4000







STANDARD ACCESSORIES

The performance and life of the transmission depend upon the proper installation and use of accessory components including heat shields, vent kits, and more.

Flexplate Kit	TRN8350
TCM Bracket Kit	TCM8360
Transmission Controller	TCM2600/2800*
Transmission Harness	Varies*
Long Dipstick Kit	TRN7011
Short Dipstick Kit	TRN7089
Overflow Vent Kit	TRN7006

*NOTE: The transmission controller and harness vary based on application. Contact PCS for more information.

OPTIONAL ACCESSORIES

PCS offers a number of accessories that are vehicle, customer, and application specific. These kits may add crucial features to the vehicle design such as improved maintainability, easier integration, and overall system upgrades.

Auxiliary Transmission Cooler	TRN7110
Remote ATF Filter Kit	TRN7700
C6 Cooler Line Kit	TRN7085
C6 Mount Adapter Kit	BRK2019
Engine RPM Sensor (C6 Replacement)	SNS1025
F-N-R Electronic Shifter	TRN1200
Heat Shield Kit	TRN7012
C6 MAP Sensor Kit	TRN7086
Remote Mount TPS Adapter Kit v2	TRN6040
Turn Signal	TRN1201

4LHD/4LHDX TRANSMISSIONS Support Tools

SUPPORT TOOLS

The ability to quickly and effortlessly run diagnostics on all transmission control systems is the most powerful feature of any modern, electronically controlled transmission. We have developed the necessary tools and a five-step troubleshooting process to accurately determine a fault's root cause in under fifteen minutes. Proper training is required to use these tools. Training is available upon request.

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Reference documentation available at GSEhelp.com



TRANSMISSION DIAGNOSTIC DEVICE (TDD)

The transmission diagnostic device (TDD) is a useful tool for service stations supporting the PCS 4LHD and 4LHDX lines of transmissions. Often times, transmission issues are caused by a vehicle sensor and not the transmission itself. With the transmission diagnostic device, the technician can operate the transmission directly and isolate if the problem is internal or external to the transmission.

Transmission Diagnostic Device w/harness

TDD5000







FORD C6 REPLACEMENT

The C6 replacement package includes a 100% factory new GM 4-speed transmission equipped with a bellhousing, torque converter, and extension housing that replicate a Ford C6 transmission. The bellhousing will mate directly where the previous C6 was installed. The torque converter was designed to include studs that match the Ford bolt pattern to allow the use of the existing flexplate. The existing driveshaft can also be used as the PCS 4LC6 has the same overall length as the Ford C6 transmission. It does not require crossmember, engine adapter, or mount modification, and can even utilize the existing C6 parking brake.

The package also includes a transmission controller which continuously monitors the transmission and can alert the operator if any abnormalities are detected. The transmission controller can also be programmed to customer desired shift points, gear lockouts, and any other unique operating modes.



SAFE GEAR ENGAGEMENT

Full programmability of gear engagement conditions so the vehicle will only engage forward or reverse when it is safe. Safe input conditions include brake applied, idle RPM, vehicle stopped, and more.

🔀 C6 PACKAGING

No need to redesign adapter plates, crossmembers, or driveshafts to install this technology into an older vehicle. Drop-in C6 packaging allows installation of the new transmission exactly where a C6 was installed. Same bellhousing, same output shaft, same overall length.



ELECTRONIC SHIFT

No shift cable needed. Eliminate shift cable headaches caused from poor adjustment, cable wear, or ice. The PCS 4LHD can be shifted into forward and reverse with electronic signals instead of a shift cable.

GM 4-speed transmission with Abuse Protection and C6 packaging

TRN4265



FORD C6 AND PCS 4LC6 COMPARISON



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ELECTRONIC SHIFTER

GSE



INDUSTRIAL ELECTRONIC SHIFTER (IES2000)

The IES2000 is an industrial alternative to existing mechanical and electronic shifters. Designed around IP66 sealing standards and continuous duty-cycles, this unit will withstand the harshest environments and operators. Another primary feature is the identical mounting cavity and hole-pattern as the traditional GSE shifter. Non-contact hall-effect sensing is used for range position detection, thus sliding contact wear is not an issue. The IES2000 is a fully configurable unit capable of CAN-bus communications along with direct outputs for signaling forward, neutral and reverse positions. A shift inhibit feature mechanically locks the shifter in neutral, preventing the operator from shifting out of neutral until all of the configured safety conditions are fulfilled.

SHIFTER SPECIFICATIONS	
Neutral Lock	Digital input from TCM shift inhibit disables the neutral lock and allows the operator to shift from the neutral position.
Relay Outputs	Two available solid state relay outputs for powering 10 Amp max circuits. (such as neutral safety or backup lights)
Position Outputs	Output signal pins for forward, neutral, and reverse positions. Configurable to output either power or ground.
Mating Connector	Deutsch DT06-12SA-P012
Expected Life Cycle	1,000,000 cycles
Operating Temp Range	-40 to 85°C (-40 to 185°F)
Operating Voltage Range	8V to 32V
CAN	J1939 or configurable CAN communication
Handle Dead Load Limit (Neutral Lock)	260 lb. (1160 N)
Features	IP66 Hall effect based non-contact position sensing Transmission warning indicator
Configurations*	F-N-R, R-N-F, R-N-D-1, R-N-D-2-1

*NOTE: Left and right hand configurations available.

CONTROL MODULES AND DISPLAYS



4.9"



3.4"

DASH PANELS

As vehicles become more complex and customer driver panel requirements increase, what was once a few analog gauges quickly becomes a complicated and expensive panel of wires, gauges, buzzers, and more. With the PCS dash, the panel can be reduced to only four wires; power, ground, and CAN. The panel can be programmed for virtually unlimited gauges, warnings, and output functions. Two display sizes as shown above are available.

DIAGNOSTICS

A flashing indicator on the dash alerts the driver if there is a problem, but there is not much information a single light can convey to the operator. With the PCS dash panel, trouble codes are indicated to the operator with clear descriptions. If the driver needs more information about the fault such as causes or troubleshooting information, the operator can select the diagnostic screen for assistance.

CONTROL OUTPUTS

The dash has virtually unlimited flexibility when it comes to the menu structure. There are 4 soft-keys that can be configured to meet the user's needs. Button functionality could include on/off switches for lights, pumps, etc. Custom programming can also be performed to enable or disable certain menus based on vehicle status. One example could be to only allow the pump screen to be accessible when the vehicle is stopped and in neutral.

ESSENTIAL FOR GLOBAL SOLUTIONS

The PCS dash can be programmed in multiple languages so the messages and gauges (text labels and units) can be user selectable to match the region of the world the vehicle is located in.

J1939 COMPATIBLE

The dash panel can use proprietary CAN or J1939 messaging.

CUSTOM SPLASH SCREEN

The dash panel can be programmed with a custom splash screen and logo for a more integrated appearance with the vehicle.

TRANSMISSIONS

New Transmissions

OE

PCS offers a complete line of factory new transmissions including 4 and 6-speed RWD and FWD transmissions. Available transmissions include GM 4L60/65/70E, GM 6L50/80/90, GM 6T40/70/75, and GTP 4L80/85E. PCS can provide a turn-key solution including controller, harness, flexplate, dipstick, and more. SAE3 and SAE4 bellhousings are available. PCS can design and manufacture custom bellhousings for nearly any engine upon request.

	GM 4L60/65/70E	GTP 4L80/85E	GM 6L50	GM 6L80	GM 6L90	6T40/45	6T70/75	8L90
Туре	Four speed, longitudinal rear-wheel drive, electronically controlled, automatic overdrive transmission with torque converter clutch	Four, five, or six speed, longitudinal rear-wheel drive, electronically controlled, automatic overdrive transmission with torque converter clutch and optional electronic engine braking	Six-speed RWD/ AWD, electronically controlled automatic overdrive transmission w/torque converter clutch, Clutch-to-clutch architecture, w/Integral Electro/Hydraulic Controls Module	Six-speed RWD/4WD/ AWD, electronically controlled automatic overdrive transmission w/torque converter clutch. Clutch-to-clutch architecture, w/Integral Electro/Hydraulic Controls Module	Six-speed RWD/4WD/ AWD, electronically controlled automatic overdrive transmission wlorque converter clutch. Clutch-to-clutch architecture, wl/ntegral Electro/Hydraulic Controls Module	Six-speed FWD/ AWD, electronically controlled automatic overdrive transmission w/torque converter elutch. Clutch-to-clutch architecture, wi/Integral Electro/Hydraulic Controls Module	Six-speed FWD/ AWD, electronically controlled automatic overdrive transmission w/torque converter clutch. Clutch-to-clutch architecture, w/Integral Electro/Hydraulic Controls Module	Eight speed RWD/ AWD, electronically controlled automatic overdrive transmission with torque converter clutch. Clutch-to-clutch architecture, with external transmission control module
Engine Range	2.2L – 6.2L Gasoline/ Diesel	4.8L – 6.0L Gasoline, 6.5L – 6.6L Diesel	2.0L - 4.6L Gasoline, 2.9L Diesel	4.4L SC, 6.0L, 6.2L Gasoline	6.2L - Gasoline, 6.6L Diesel	1.4L - 3.0L Gasoline/ Diesel	3.6L - 4.6L Gasoline/ Diesel	6.2L - Gasoline, 6.6L Diesel
Maximum Engine Torque	4L60E: 350 lb-ft (475 Nm) 4L65E: 380 lb-ft (515 Nm) 4L70E: 400 lb-ft (542 Nm)	4L80E: 440 lb-ft (597 Nm) 4L85E: 460 lb-ft (624 Nm)	332 lb-ft (450 Nm)	487 lb-ft (660 Nm)	531 lb-ft (720 Nm)	232 lb-ft (315 Nm)	295 lb-ft (400 Nm)	635 lb-ft (860 Nm)
Maximum Gearbox Torque	4L60E: 610 lb-ft (827 Nm) 4L65E: 670 lb-ft (908 Nm) 4L70E: 670 lb-ft (908 Nm)	885 lb-ft (1200 Nm)	479 lb-ft (650 Nm)	664 lb-ft (900 Nm)	885 lb-ft (1200 Nm)	295 lb-ft (400 Nm)	380 lb-ft (515 Nm)	738 lb-ft (1000 Nm)
Available Gear Ratio 1,2,3,4,5*,6* 7*,8*,R *When available	3 059, 1 625, 1 0, 0.696, -2.294	2.48, 1.48, 1.00, 0.75, -2.07 2.48, 1.86, 1.48, 1.00, 0.75, -2.07 2.98, 1.57, 1.00, 0.75, -2.46 2.98, 2.24, 1.57, 1.00, 0.75, -2.46 2.98, 2.24, 1.57, 1.18, 1.00, 0.75, -2.46	4.065, 2.371, 1.551, 1.157, 0.853, 0.674, -3.200	4.027, 2.364, 1.532, 1.152, 0.852, 0.667, -3.064	4.027, 2.364, 1.532, 1.152, 0.852, 0.667, -3.064	4.584, 2.964, 1.912, 1.446, 1.000, 0.746, 2.940	4.484, 2.872, 1.842, 1.414, 1.000, 0.742, 2.882	4.560, 2.970, 2.080, 1.690, 1.270, 1.000, 0.850, 0.650, 3.820
Maximum Gross Vehicle Weight (application and axle ratio dependent)	8,600 lb (3,900 kg)	18,000 lb (8,165 kg)	6,613 lb (3,000 kg)	8,600 lb (3,900 kg)	15,000 lb (6,803 kg)	4,850 lb (2,200 kg)	6,400 lb (2,909 kg)	13,200 lb (6,000 kg)
Maximum Gross Combined Vehicle Weight (application and axle ratio dependent)	15,500 lb (7030 kg)	22,000 lb (9979 kg)	12,505 lb (5672 kg)	14,000 lb (6350 kg)	21,000 lb (9525 kg)	Application Dependent	Application Dependent	Application Dependent
7-Position Quadrant	P,R,N,OD,D,2,1	P,R,N,OD,D,2,1	P,R,N,D,(M)	P,R,N,D,(M)	P,R,N,D,(M)	P,R,N,D,(M)	P,R,N,D,(M)	5 position (P,R,N,D,M) protected for 6 position (P,R,N,D,M,L)
Case	Die cast aluminum, removable bellhousing	Die cast aluminum	Die cast aluminum (3-piece: bell & main w/ extension)	Die cast aluminum (3-piece: bell & main w/ extension)	Die cast aluminum (3-piece: bell & main w/ extension)	Die cast aluminum	Die cast aluminum	Die cast aluminum
Shift Pattern	(2) Two-way on/off solenoids	(2) Two-way on/off solenoids (3) Two-way on/ off solenoids for 5/6 speed	(2) Three-way on/off solenoids	(2) Three-way on/off solenoids	(2) Three-way on/off solenoids	(6) Variable bleed solenoids	(6) Variable bleed solenoids	(6) variable force solenoids. One for each clutch and one for TCC
Shift Quality	Pressure control solenoid 3-2 control solenoid (some models)	Pressure control solenoid	(5) Variable bleed solenoids	(5) Variable bleed solenoids	(5) Variable bleed solenoids	(6) Variable bleed solenoids	(6) Variable bleed solenoids	(6) variable force solenoids. One for each clutch and one for TCC
Torque Converter Clutch	Pulse width modulated solenoid control	Pulse width modulated solenoid control	Variable bleed solenoid	Variable bleed solenoid	Variable bleed solenoid	Variable bleed solenoid	Variable bleed solenoid	Variable Force Solenoid ECCC, 2 path, turbine damper
Converter Size	Various	310 mm	240/245/258 mm	258/300 mm	300 mm	236 mm	246 mm	258mm (reference)
Fluid Type	DEXRON VI	DEXRON VI	DEXRON VI	DEXRON VI	DEXRON VI	DEXRON VI	DEXRON VI	Dexron High Performance ATF
Transmission Weight	Typical Bell, 2-piece case – 2WD: 200 lb (91 kg), 4WD: 196 lb (88 kg)	Wet: 254 lb (115 kg)	Wet: 187 - 198 lb (85-89 kg)	Wet: 225 lb (102 kg)	Wet: 240 lb (109 kg)	Wet: 187 lb (85 kg)	Wet: 230 - 232 lb (104 kg - 105 kg)	210 lb - 218 lb (95.5 kg - 99 kg)
Fluid Capacity (approx.)	8.8 – 11.4 qt (8.3 – 10.7 Liters)	13.5 qt (12.8 Liters)	10.1 – 11.4 qt (9.6 - 10.82 Liters)	10.2 – 12.8 qt (9.7 – 12.1 Liters)	12.3 - 13.3 qt (11.6 - 12.54 Liters)	8.5 qt (8.0 Liters)	9.5 qt (9.0 Liters)	11 qt (10.5 Liters)
Pressure Taps Available	Line pressure	Line pressure	Line pressure	Line pressure	Line pressure	Line pressure	Line pressure	c12345R Clutch

TRANSMISSIONS Transmission Reference



Trans Model Bell Main Case Length to Length to Engine Block Length to Engine Center Trans Model Housing Case Extension Flange Shaft	er Line :o
Lug Housing Mount Botto	m Pan
4L60/70 6.941 15.421 8.909 N/A 30.975 0.853 31.272 24.331 7.4 2WD 176.30 391.70 226.30 N/A 786.75 21.67 794.30 618.00 198	320 3.60
4L60/70 6.941 15.421 4.433 N/A 26.941 0.853 26.795 24.353 7.4 4WD 176.30 391.70 112.60 N/A 684.30 21.67 680.60 618.56 194	320 3.60
No 32.1745 0.893 31.505 30.672 7.1 4L80 bell 660.65 139.57 736.71 (2WD) 22.68 800.23 771.19 198 housing 817.23 817.23 817.23 817.23 100.000	795 3.00
6L50 6.181 16.752 2.283 27.559 26.437 0.413 25.216 25.279 9.33 157.00 425.50 58.00 700.00 671.50 10.50 640.50 642.10 233	177 3.10
6L80 6.74 16.468 3.49 27.815 29.089 0.853 26.699 N/A 9.7 Fixed Yoke 171.20 418.30 88.66 706.51 738.87 21.67 678.16 N/A 9.7	196 3.60
6L80 6.74 16.468 5.87 N/A 29.962 0.853 30.850 25.595 9.33 Slip Yoke 171.20 418.30 149.10 N/A 761.06 21.67 783.60 650.10 233	196 3.60
6L80 4WD 6.74 171.20 16.468 418.30 3.587 91.10 N/A 26.968 684.98 0.853 21.67 26.795 680.60 25.409 645.38 9.7	196 3.60
6L90 2WD 7.07 17.840 5.629 N/A 31.439 0.909 30.542 27.480 9.1 (Duramax) 179.63 453.15 143.00 N/A 798.56 23.10 775.78 698.00 23.13	196 3.60
6L90 4WD 6.74 17.84 N/A 28.559 28.559 0.853 N/A N/A 9.7 233 171.20 453.15 N/A 725.42 725.42 21.67 N/A 9.7	196 3.60
8L90 2WD Slip Yoke N/A N/A N/A 29.002 736.66 0.852 21.64 28.227 716.96 25.791 655.10 8.4	391 5.84
8L90 4WD/AWD N/A N/A N/A 27.364 695.04 0.852 21.64 26.795 680.6 25.365 644.27 8.4 225	391 5.84

NOTE:

Dimensions are for typical applications. Dimensions will vary based on converter, bellhousing, and extension housing. For reference only.



ONE PACKAGE. THREE UNIQUE CONTROLLERS

The TCM2600, TCM2650, and TCM2800 all share the same packaging. For the OEM, this simplifies harness termination and mounting brackets since they will remain constant regardless of the chosen application and controller. It also provides the ability to easily upgrade from a TCM2600 to a TCM2800 by simply installing the new module.

The case is designed to robust ingress protection levels and temperature ratings. This rugged design enables the module to be installed on the transmission and below the fording line of the vehicle. Installation on the transmission greatly reduces wire harness complexity, weight, and cost. This also provides the ability to ship transmission or powertrain packages complete with the controller and harness already installed. Installation into the vehicle on the production line would only require installing the transmission and connecting the vehicle interface connector.

TCM2600	The TCM2600 is the cost-effective industrial workhorse of the product line. The TCM2600 is an excellent option for domestic transmissions where only low-side solenoid control is required. Current monitoring is available on four of the PWM channels. The TCM2600 includes two CAN interfaces for seamless integration with CAN based vehicles or ECUs.
TCM2650	The TCM2650 is designed for situations where a standalone transmission controller cannot control the transmission directly. Newer transmissions, including the GM 6L80, contain the factory transmission control module inside the valve body. These mechatronic valve body designs make it nearly impossible to directly control the transmission solenoids with a standalone transmission controller. It is also very difficult to remove the transmission and controller from the factory powertrain since all of the transmission parameters are received from other vehicle modules including the engine controller, body control module, etc. The PCS TCM2650 is an all-inone solution that will allow the transmission and factory controller to be installed in any vehicle with any engine combination and maintain a fully functional transmission. The TCM2650 can also be programmed with 2 additional calibrations, each including shift tables and a torque converter lockup table. The TCM2650 is compatible with the GM 6L45/50, 6L80/90, 6T30/40/45, 6T70/75, Allison 1000 (5 and 6 speeds), the 2nd generation ZF 6HP and the Volkswagen DSG.
TCM2800	The TCM2800 is the most powerful and versatile transmission controller. Similar to all PCS controllers, the TCM2800 features multiple calibrations (sport-mode, tow-haul mode, etc), programmable shift points, shift firmness, and torque converter lockup. Unique to the TCM2800, PWM outputs are programmable to either active high or low, supporting a wide range of transmissions from GM, Ford, Chrysler, Nissan, Toyota, and others. All 12 outputs also have current monitoring for precise closed loop current control. The extensive, programmable hardware available on the TCM2800 makes it an excellent choice to perform body control functions. The TCM2800 can be configured to read engine sensors and transmit the data on the CAN bus to other modules or dash displays. The outputs on the TCM2800 can also be programmed for non-transmission control functions such as engine shutdown after a certain amount of time while idling to comply with idle regulations.

OE

OEM Controllers

XCM2000 TRANSFER CASE MODULE

The PCS transfer case module is a standalone module that controls most modern electronic shift transfer cases. Shifting is commanded using CAN, which is configurable for J1939 or a proprietary scheme. Diagnostic messages are also transmitted to alert the driver if there are any issues with the transfer case. The control module has programmable safety set points for shifting into 4WD Low. This includes max speed, gear, and brake status. The module is designed for rugged use and is sealed to IP68 ingress protection standards, allowing it to be mounted anywhere on the vehicle.



Weight:	0.64 lbs
Case Material & Finish:	Black Anodized
Voltage Range:	8-18 VDC Standard (24 VDC models available)
Operating Temperature:	-50 to 125°C
Storage Temperature:	-55 to 125°C
Ingress Protection:	IP68
Communication Interface:	1 x CAN 2.0b



TCM2100 TRANSMISSION CONTROLLER

The TCM2100 is targeted for a vehicle that does not require the TCM to be sealed against water ingress. The extruded aluminum case and automotive style connector can be mounted in a dry location or placed into a sealed enclosure if necessary.

The TCM2100 is targeted for the OEM that requires a budget friendly transmission controller without rigorous environmental requirements. Similar to all of PCS's OEM controllers, the TCM2100 features a full suite of diagnostic trouble codes and will use a fail-safe condition if certain error states are encountered.

Weight:	0.87 lbs
Case Material & Finish:	Extruded Aluminum
Voltage Range:	8-18 VDC Standard (24 VDC models available)
Operating Temperature:	-50 to 125°C
Storage Temperature:	-55 to 125°C
Ingress Protection:	IP50
Communication Interface:	1 x CAN 2.0b, 1 x RS-232, 1 x GM ALDL
Inputs (Frequency Range 0-10 kHz):	3
Analog Voltage (0-5 VDC):	2 total (1 with kΩ 5V pull-up)
Digital (Programmable active high or low):	6
Outputs:	PWM: 7 Digital: 1
Output Channel Current Monitoring:	1 dedicated high-side measured output

OEM Controller Overview

OE

PHYSICAL	TCM2100	TCM2600/2650	TCM2800
Weight	0.87 lb	0.82 lb 0.82 lb	
Dimensions (L x W x H)	4.9" x 6.1" x 1.5"	5.3" x 3.7" x 1.5" 5.3" x 3.7" x 1.5"	
Case Material & Finish	Extruded Aluminum	Aluminum Black Anodized	
OPERATING CONDITIONS			
Voltage Range	8-18 VDC standard (24 VDC models available)	8-18 VDC standard (24 VDC models available)	8-36 VDC
Current (device only, not including outputs)	On: 100 mA Quiescent: 9 mA	On: 100 mA Quiescent: 9 mA	On: 100 mA Quiescent: 9 mA
Operating Temperature	-50 to 125°C	-50 to 125°C	-50 to 125°C
Storage Temperature	-55 to 125°C	-55 to 150°C	-55 to 150°C
Reverse/Transient Protections	Yes	Yes	Yes
Ingress Protection	IP50	IP69K	IP69K
Harness Interface	Delphi 56-pin	Molex 56-pin	Molex 56-pin
EMI Immunity	All m PCS offers certification test	odules are designed for robust EMI immuing for the desired controller/transmission	unity. n package as a cost option.
COMMUNICATION			
Interface	1 x CAN 2.0b, 1 x RS-232, 1 x GM ALDL	2 x CAN 2.0b, 1 x RS-232, 1 x J1850	2 x CAN 2.0b, 1 x RS-232, 1 x J1850
Real-time tuning and data logging with a PC	Yes	Yes	Yes
Real-time tuning and data logging with PCS hand-held interface	Yes	Yes	Yes
In-Field Flash Upgradable	Yes	Yes	Yes
INPUTS			
Frequency (Range 0-10 kHz)	3	4	4
Programmable Trigger Levels and Filtering for Frequency Inputs	2 Channels	2 Channels	4 Channels
Analog Voltage (0-5 VDC)	2 total 1 with 1kΩ 5V pull-up	2 total 1 with 1kΩ 5V pull-up	6 total 2 with 1kΩ 5V pull-up
Programmable Input Parameters	Yes	Yes	Yes
Failure Diagnostics for each Analog Input	Yes	Yes	Yes
Digital (programmable active high or low)	6	16	16
Over Voltage Protection for each Input	Yes	Yes	Yes
OUTPUTS			
PWM	7	7	9
Digital	1	1	3
PWM & Digital Maximum Current	3.5 Amp	3.5 Amp	3.5 Amp
Short Circuit, Over Current & Thermal Protection	Yes	Yes	Yes
User Selectable Output Drive Type (Battery Voltage or Ground)	Ground Only	Ground Only	Yes
Programmable Output Type/Parameter for PWM and Digital Outputs	Yes	Yes	Yes
Output Channel Current Monitoring	1 Dedicated High-Side Measured Output	4 PWM Channels	All Output Channels

OEM Controller Application C	Chart
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GM SUPPORTED APPLICATIONS	TCM2100	TCM2600	TCM2650	TCM2800
4L60/65/70E	•	•		•
4L80/85E	•	•		•
5L40/50	•	•		•
6L45/50			•	•
6L80/90			•	•
4T40/45E	•	•		•
4T60/65E	•	•		•
4T80E	•	•		•
6T40/45			•	•
6T70/75			•	•
FORD SUPPORTED APPLICATIONS				
AODE	•	•		•
AXODE	•	•		•
AX4S	•	•		•
4EAT	•	•		•
4R44	•	•		•
4R70W	•	•		•
E4OD	•	•		•
4R100	•	•		•
4R75	•	•		•
CD4E	•	•		•
5R55S/W/N	•	•		•
5R55E	•	•		•
4F27E	•	•		•
5R110				•
6R80				•
6R140				•
CHRYSLER SUPPORTED APPLICATIONS				
41TE	•	•		•
42LE	•	•		•
42RLE	•	•		•
545RFE	•	•		•
68RFE	•	•		•
722.6/NAG 1	•	•		•
OTHER SUPPORTED APPLICATIONS				
Aisin A340E				•
Aisin A540E				•
Aisin A650E				•
Aisin AB60E				•
Toyota U140F				•
Toyota U340E				•
Nissan RE4R03A/01A				•
Nissan RE5R05A				•
Mitsubishi F4A3/W4A3				•
Mazda R4A-EL				٠
Allison 1000 (5 and 6 speed)			•	•
ZF 4HP	•	•		•
ZF 5HP	•	•		•
ZF 6HP			•	•
Volkswagen DSG			•	•

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GEAR INDICATORS

The PCS gear indicator scans a vehicle's CAN bus and displays current gear data, allowing technicians and vehicle operators to monitor the actual current gear and not just the lever position used by the transmission.

The data is displayed on a 5x8 LED dot-matrix display housed in a rugged plastic enclosure. The module automatically enters a low-power standby mode when no activity is detected on the vehicle's CAN bus, ensuring low battery drain when the vehicle is not in use. There are three available harness options including unterminated, OBDII, or PCS option connector.

FEATURES

- Auto scans to determine CAN standard used on vehicle (No user setup is required)
- Red LED 5x8 matrix used to display characters P, N, R, 1, 2, 3, 4, 5, 6, 7, 8
- GDS Series (Square): Display brightness automatically adjusts to match ambient light levels
- GDR Series (Round): Detects headlight status. If 12V is present, display will dim for "Night Mode."
- Rated for 8-36V nominal battery voltage
- · Power, Ground, CANH and CANL are the only necessary connections

CAN FORMATS

- PCS TCU "Current Gear" @ 500kbps
- PCS D200 Dashlogger "CGER" @ 500kbps
- GMLAN "Commanded Gear" @ 500kbps
- J1939 "Current Gear" @ 250kbps

DESCRIPTION	UNTERMINATED	OBDII	PCS OPTION CONNECTOR
Black Square Gear Indicator, Red Display	GDS5010	GDS5011	GDS5012
Black Square Gear Indicator, Blue Display	GDS5020	GDS5021	GDS5022
Black Square Gear Indicator, Green Display	GDS5030	GDS5031	GDS5032
Black Square Gear Indicator, Yellow Display	GDS5040	GDS5041	GDS5042
Black Round Gear Indicator, Current Gear	GDR5000	N/A	N/A
Black Round Gear Indicator, Lever Position	GDR5001	N/A	N/A
Polished Round Gear Indicator, Current Gear	GDR5100	N/A	N/A
Polished Round Gear Indicator, Lever Position	GDR5101	N/A	N/A

DISPLAYS Data Logging and Diagnostics



D200 DASHLOGGER

The D200 Dash Logger is a high contrast, 6-inch viewable, transflective touchscreen that is easily seen in day or night. The durable, high sensitivity, resistive touchscreen can be easily activated with a stylus or finger.

INPUTS AND OUTPUTS	The D200 has 8 analog inputs, 2 speed inputs, and 2 PWM outputs. The analog inputs can be used for engine sensors, a data log start switch, or any other voltage you wish to monitor and log. All D200 inputs can also be labeled by the user for a customized display. The versatile PWM outputs can perform a variety of tasks from an external shift light to boost control. The D200 communicates with external devices using RS-232 or CAN 2.0b. RS-232 is typically used for communicating with serial ECUs. CAN is used to communicate with all other PCS devices keeping wire harness requirements to a bare minimum.
MONITOR Screens	The D200 offers several fully programmable monitor screens capable of displaying any combination of inputs. This allows the user to select the most appropriate view for the situation, such as a large tachometer for the track or a screen with over 20 items for diagnosing a problem. Configuration of individual gauges is as simple as touching the gauge on the screen and selecting the input you wish to associate with it. The D200 also allows the user to select the scale and units for the displayed data. Programmable alarms allow the user to set high and low points for a particular input. If the input exceeds the specifications, the D200 will alert the driver by flashing the gauge or item. Shift light functionality can be accomplished by having the D200 flash the screen at a desired RPM.
DATALOGGING And Playback	The D200 is the heart of the PCS logging system. When combined with PCS data logging software, the user is able to analyze all the information. The D200 is equipped with 2MB of on-board data log memory. Additional memory (up to 16MB) is available at the time of purchase. To optimize the memory usage, the user can select different logging rates for each device from 5HZ up to 1000HZ. The start of the log is triggered with the touchscreen or a button wired to an input. Multiple logs can be stored on the unit. Logs are stored by date and time and are also viewable through a data log explorer on the D200 screen itself. Any run can be played back on the D200 to gather information about the run without needing a laptop. The laptop communicates using USB, making quick work of downloading large data logs.

OEM DIAGNOSTICS

PCS offers several tools for OEM in-field support. These tools enable the technician to read and clear trouble codes, view sensor data, and capture a data log. The data logs can be reviewed onsite using the PC software or sent back to PCS or the vehicle manufacturer for further analysis. These tools do not allow access to the calibration on the transmission controller to ensure the factory calibration is not modified, potentially compromising the life of the transmission.

Available products include Windows based PC software, a 6-inch touchscreen LCD, and a 3-inch color LCD screen. Communication is established using RS-232, GM ALDL, or CAN.

These tools are also well suited for an end-of-line test on the vehicle assembly line to check for trouble codes and verify vital transmission inputs including throttle position, vehicle speed, and engine RPM.





GEAR SELECT MODULE

The GSM Push Button Shifter is an electronically controlled shifter that replaces the shift lever and offers precise, split-second shifting capability with the push of a button. The GSM was designed to work with nearly any automatic transmission and is well suited for a variety of markets including automotive, military, and agricultural.

GEAR SELECT MODULE KIT	
Gear Select Module Kit w/Black Anodized Remote Configured for PCS CAN	GSM5000
Gear Select Module Kit w/Polished Remote Configured for PCS CAN	GSM5001
Gear Select Module Kit w/Black Anodized Remote Configured for Hard Wired Vehicle Speed and Brake Light	GSM5005
Gear Select Module Kit w/Polished Remote Configured for Hard Wired Vehicle Speed and Brake Light	GSM5006
Gear Select Module Kit w/Black Anodized Inline Vertical Remote Configured for PCS CAN	GSM5010
Gear Select Module Kit w/Black Anodized Inline Horizontal Remote Configured for PCS CAN	GSM5011
Gear Select Module Kit w/Polished Inline Vertical Remote Configured for PCS CAN	GSM5012
Gear Select Module Kit w/Polished Inline Horizontal Remote Configured for PCS CAN	GSM5013
Gear Select Module Kit w/Black Anodized Inline Vertical Remote Configured for Hard Wired Vehicle Speed and Brake Light	GSM5014
Gear Select Module Kit w/Black Anodized Inline Horizontal Remote Configured for Hard Wired Vehicle Speed and Brake Light	GSM5015
Gear Select Module Kit w/Polished Inline Vertical Remote Configured For Hard Wired Vehicle Speed and Brake Light	GSM5016
Gear Select Module Kit w/Polished Inline Horizontal Remote Configured for Hard Wired Vehicle Speed and Brake Light	GSM5017

VEHICLE SPEED INTERFACES	
GM Speed Signal Generator	GSM2050
Ford Speed Signal Generator	GSM2060
GSM GM Speed Sensor Pass-Through Adapter	GSM2080
GM Bulkhead Pass-Through w/CAN and Option Connector Breakouts	WRE3500

INSTALL KITS	
GSM Install Kit for GM 4L60/65/70/80/85 w/ PRNDL	GSM2010
GSM Install Kit for Ford AODE/4R70W	GSM2011
GSM Install Kit for GM TH-200/200-4R/250/350/400/700-R4, 4L60/65/60/85 w/out PRNDL	GSM2012
GSM Install Kit for Ford 1965-1982 C4	GSM2013
GSM Install Kit for GM 1962-1973 Powerglide	GSM2014
GSM Install Kit for Ford AOD	GSM2015
GSM Install Kit for Chrysler 1966+ 727 or 904 Torqueflite and AMC 1972+ Torque Command Transmission	GSM2016
GSM Install Kit for Ford C6	GSM2017

ELECTRONIC SHIFTERS



PADDLE SHIFTER

The PCS Paddle Shifter provides upshift and downshift commands to a PCS transmission controller, a PCS GSM push button shifter, or a GM mechatronic transmission such as the 6L80. The paddle shifter is available for either 5/6-bolt or 9-bolt steering columns. The paddle shifter communicates wirelessly to a receiver module that interfaces the CAN network. The wireless communication drastically simplifies the wiring, requiring only the horn wire to be used to power the paddle shifter. The paddles were precisely engineered to provide a positive detent feel the moment the switch is activated to eliminate any guessing when the transmission was commanded to shift.

Black Anodized 5/6-Bolt Paddle Shifter Kit w/Quick Connect Harness	PS2000
Black Anodized 5/6-Bolt Paddle Shifter Kit w/Display and Quick Connect Harness	PS2001
Black Anodized 5/6-Bolt Paddle Shifter Kit w/Unterminated Harness	PS2002
Black Anodized 5/6-Bolt Paddle Shifter Kit w/Display and Unterminated Harness	PS2003
Black Anodized 9-Bolt Paddle Shifter Kit w/Quick Connect Harness	PS2005
Black Anodized 9-Bolt Paddle Shifter Kit w/Display and Quick Connect Harness	PS2006
Black Anodized 9-Bolt Paddle Shifter Kit w/Unterminated Harness	PS2007
Black Anodized 9-Bolt Paddle Shifter Kit w/Display and Unterminated Harness	PS2008
Polished 5/6-Bolt Paddle Shifter Kit w/Quick Connect Harness	PS2050
Polished 5/6-Bolt Paddle Shifter Kit w/Display and Quick Connect Harness	PS2051
Polished 5/6-Bolt Paddle Shifter Kit w/Unterminated Harness	PS2052
Polished 5/6-Bolt Paddle Shifter Kit w/Display and Unterminated Harness	PS2053
Polished 9-Bolt Paddle Shifter Kit w/Quick Connect Harness	PS2055
Polished 9-Bolt Paddle Shifter Kit w/Display and Quick Connect Harness	PS2056
Polished 9-Bolt Paddle Shifter Kit w/Unterminated Harness	PS2057
Polished 9-Bolt Paddle Shifter Kit w/Display and Unterminated Harness	PS2058



DATA ACQUISITION

and CAN 2.0B, this USB interface allows for monitoring, transmitting, and bridging CAN networks. Windows software is included to configure speeds and operation and also allows data logging and message filtering. The interface can be used as a single channel device interfacing one CAN network or can independently monitor and bridge two different CAN networks running at different speeds.

Dual Channel CAN-USB Interface Cable

OE

CAN Modules

CAN5000

THREE-AXIS ACCELEROMETER AND GYRO MODULE

The PCS 3-Axis Accelerometer and Gyro module allows monitoring of linear and angular acceleration rates for determining tire and suspension setup, track conditions, and general vehicle dynamics. The accelerometer outputs all three axes via CAN bus where it can be displayed and logged. The axis resolution is programmable so the module can be optimized for the particular application.

3-Axis Accelerometer & Gyro Module

ACC3000

EGT4025

EGT4027

EGT4028

EGT4024

EGT4029

EXHAUST GAS TEMPERATURE MODULE

Exhaust Gas Temperature, or EGT, is a fundamental tool in tuning, diagnosing problems, and ensuring the proper operating range of an internal combustion engine. This simple, but effective tool can diagnose potential engine problems before failure and ensure proper cylinder equalization when tuning or running an engine at the edge of its operating capabilities.

Single Channel EGT Module (converts temperature to 0-5 volt analog voltage)	EGT5000
8-channel EGT Module Kit w/Harness	EGT5100



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THERMOCOUPLES

Thermocouple 1/4" tube 12" w/Mini Connector

Thermocouple 1/4" tube 48" w/Mini Connector

Thermocouple 1/4" tube 60" w/Mini Connector







DATA ACQUISITION Sensors

PRESSURE SENSORS

3-Bar MAP Sensor	SNS1002
0-100 PSI Pressure Sensor	SNS1003
0-250 PSI Pressure Sensor	SNS1004
0-1000 PSI Pressure Sensor	SNS1005
0-3000 PSI Pressure Sensor	SNS1007

TEMPERATURE SENSORS

Intake Air Temperature Sensor	SNS3000
Coolant/Fluid Temperature Sensor	SNS3001

THROTTLE POSITION SENSORS

Remote Mount Throttle Position Sensor Kit	TCM6000
External Arm Style TPS	SNS0002

LINEAR SENSORS

Linear Sensor 200mm Stroke	SNS2009
	0.102000

SPEED SENSORS/KITS

3/8"-24 Threaded Body Hall Effect Sensor	SNS5000
5/16"-24 Threaded Body Hall Effect Sensor	SNS5005
Two Magnet Kit	SNS5010
Sensor Kit for Mark Williams 35 Spline Yoke (2.187" diameter)	SNS5001
Sensor Kit for Moser/Mark Williams 28 Spline Yoke (1.875" diameter)	SNS5002
Sensor Kit for Strange 28 Spline Yoke (1.812" diameter)	SNS5003
Sensor Kit for Strange 28 Spline Yoke (1.812" diameter) w/Ultra Case	SNS5004
Sensor Kit for Moser 35 Spline Yoke (2.195" diameter)	SNS5006
Sensor Kit for Strange 35 Spline Yoke (2.125" diameter)	SNS5007
Clutch Speed Sensor Kit w/ 3/8"-24 Sensor	SNS5500
Clutch Speed Sensor Kit w/ 5/16"-24 Sensor	SNS5501

GPS SENSORS

5Hz GPS Sensor for D200	SNS3200
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CAN	
CAN Master Connection Kit	CON5500
CAN Add-on Connection Kit	CON5501

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Our headquarters now includes an ISO 14644-1 class 6 clean room for our state-of-the-art circuit board production line. The circuit board production line incorporates both an Automated Optical Inspection (AOI) and a dedicated X-ray machine to verify part placement and solder flow.

ENGINEERING CAPABILITIES

In addition to developing and supporting the PCS product line 100% in-house, PCS engineers help clients around the world solve challenging vehicle integration issues. We have extensive experience in driveline design, transmission design, and embedded control systems. We have the tools to assist with virtually every stage of vehicle design and development including FMEA, mechanical design, CAN architecture, EMI certification, and PPAP. Our engineers are available 24 hours, 7 days a week to provide on-site engineering support.

MECHANICAL DESIGN

Our engineers use SolidWorks® to create your 3D design into reality. Along with our ZPrinter® 450 rapid prototype machine, we also have a Milltronics VM20 CNC milling machine dedicated solely for research and design projects.

With the ability to print 3D functional prototypes in hours, our ZPrinter® 450 can save time and money when developing a new product. Prototypes can be used as functional examples for proposals, design reviews, and can also find any design errors before spending thousands on production tooling.

CIRCUIT SCHEMATIC DESIGN LAYOUT

Our engineers use Mentor Graphics PADS® to transform your idea to an electrical design. We will perform a complete electrical analysis of the system and make suggestions if improvements can be made. Our experience has taught us how to design a robust system and avoid common pitfalls.

The best circuit schematic is only as good as the layout. Careful implementation is critical at this step. Our engineers will not only consider functional and EMI factors, but also perform a thorough design for manufacturing (DFM) review to ensure the board can be built using the most reliable and cost effective process.

WIRE HARNESS DESIGN

An often overlooked component of a system is the wire harness. A properly designed wire harness not only provides superior reliability and performance, but also minimizes costs in labor to manufacture and install, weight, and other considerations to improve the overall system implementation. PCS not only provides wire harness routing, but also performs an engineering review of the harness to ensure proper wire gauge, terminals, and connectors for the application.

DRIVELINE INTEGRATION AND VALIDATION

PCS provides complete driveline integration services for vehicle manufacturers. PCS can assist during the entire development cycle including component design, selection, validation, production procurement, and final assembly.

CAPABILITIES Manufacturing



MANUFACTURING CAPABILITIES

PCS's manufacturing division, Wintronics, manufactures all of PCS's products and also provides contract manufacturing to other clients. Wintronics offers a complete partnership experience beyond the typical contract manufacturing relationship. Services including initial design assistance, design reviews for ease of manufacturing, and rapid prototyping can transform a product from an idea to full production quickly and efficiently. Wintronics has experience in high volume, military qualified products, and understands all the requirements those products must undergo to satisfy the most stringent specifications. Their continually trained and experienced staff, in combination with the scope of their assembly equipment, results in an extensive capability to provide a full range of through hole to mixed technology to fine pitch, double-sided, SMT PCB assembly. They can provide a critical design review before time and money are spent at the lab. Also, Wintronics can design custom end-of-line test equipment to ensure your product is 100% tested and burned-in before it is shipped to your customer.

PRODUCTS AND SERVICES

- Engineering Evaluation and Consultation
- · PCB Design, Layout, and Documentation
- · Design for Manufacturability and for test
- Material Management: Consignment and Turnkey
- PCBA Manufacturing
- Compliance to ANSI/IPC-A-610 Class II, III
- · ISO 9001 Quality System
- · Functional PCBA and Box Assembly Test
- Electromechanical, 'Box Build'
- · Box Assembly Burn-In

- Order Fulfillment
- Wire Harness Manufacturing
- Design for Manufacturing (DFM)
- Design for Test (DFT)
- Concurrent Engineering (CE)
- Turnkey Material Management
- MRP II/JIT
- Box Build
- Quality Assurance Program Compliance



ABOUT WINTRONICS

Wintronics is a full service, ISO 9001 certified, electronic and electromechanical contract manufacturer supporting customers in both commercial and industrial markets. The Wintronics goal is to earn the customer's respect as an extension of *their* process, *their* performance standards, *their* company. Located in Sharon, PA, Wintronics occupies an ESD compliant facility, strategically located just a few miles off Interstate 80 and within an hour's drive of Pittsburgh, Cleveland, or Youngstown, OH airports.



ABOUT PCS

Powertrain Control Solutions (PCS) is a global provider of powertrain components, including, but not limited to, control modules, automatic electronic transmissions, digital driver interface panels, and push-button shifters. PCS specializes in the physical and electronic integration of modern, advanced, efficient transmissions into vehicle designs.

CONTACT INFO



Phone +1 (804) 227-3023

Fax +1 (804) 227-3005



Tech Support

support@powertraincontrol.com

Sales sales@powertraincontrol.com



Address 10511 Old Ridge Rd. Ashland, VA 23005 USA



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