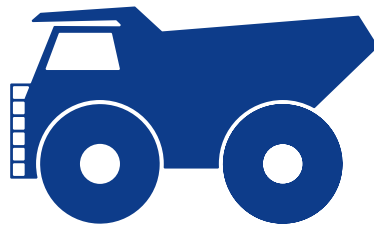




AUSTRALIAN
MADE FOR
AUSTRALIAN
CONDITIONS

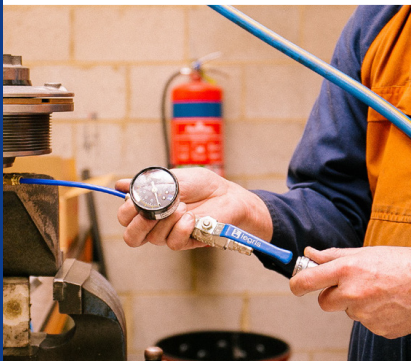


OFF HIGHWAY



ON HIGHWAY

'I JUST WANT A HORTON'



PRODUCT GUIDE

www.ngclark.com.au

NORMAN G CLARK
EST. 1919



Norman G Clark have been representing various products in the Australian market since 1919.

Norman G Clark have manufactured, imported and distributed under license to Horton USA since 1963.

Norman G Clark have manufactured all Horton OEM Fan Clutches in Melbourne Australia since 1980.

Norman G Clark A/Asia Pty Ltd
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HT/S XD FAN CLUTCH

FEATURES & BENEFITS

- OEM Specifications (Pre May 2016)
- High Temp HNBR (Blue) D-Ring & O-Ring Seals
- Standard Fine Spline Assy Bearing
- 30% greater tolerance of temperature extremes
- Less likelihood of o-ring spiral fatigue
- Less breakage and leakage
- Extended service life

APPLICATIONS

- Designed for long life and harsh under hood environments
- All 9.5" Disc Horton HT/S Clutches
- Perfect for high run time applications
- For heavy duty diesel engines: B-Doubles & Roadtrains



HT/S SD OEM FAN CLUTCH

FEATURES & BENEFITS

- OEM Specifications (Post May 2016)
- High Temp HNBR (Blue) D-Ring & O-Ring Seals
- Higher Temp Outback Fine Spline Assy Bearing
- 30% greater tolerance of temperature extremes
- Less likelihood of o-ring spiral fatigue
- Less breakage and leakage
- Extended service life

APPLICATIONS

- Designed for long life and harsh under hood environments
- All 9.5" Disc Horton HT/S Clutches
- Perfect for high run time applications
- For heavy duty diesel engines: B-Doubles & Roadtrains



HT/S OB UPGRADE FAN CLUTCH

FEATURES & BENEFITS

- Upgrade of OEM Specifications
- High Temp HNBR (Blue) D-Ring & O-Ring Seals
- Higher Temp Outback Fine Spline Assy Bearing
- Longer life
- Red Piston Friction Disc with finned design for increased heat dissipation
- Extended service life

APPLICATIONS

- Designed for long life in high ambient temperatures and harsh under hood environments
- All 9.5" Disc Horton HT/S Clutches
- Perfect for high run time applications
- For heavy duty diesel engines: B-Doubles & Roadtrains



HT/S OB UPGRADE FAN CLUTCH

FEATURES & BENEFITS

- Upgrade of OEM Specifications
- High Temp HNBR (Blue) D-Ring & O-Ring Seals
- Higher Temp Outback Fine Spline Assy Bearing
- Green Piston Friction Disc with finned design for increased heat dissipation
- Single Higher Temp Outback DRAC Pulley Bearing
- Extended service life

APPLICATIONS

- Designed for long life in high ambient temperatures and harsh under hood environments
- Selected 9.5" Disc Horton HT/S Clutches*
- Perfect for high run time applications
- For heavy duty diesel engines: B-Doubles & Roadtrains
- Premium kit for Severe Outback Duty

Please note the SOB clutch is compatible for a selection of Norman G. Clark clutches. Contact Norman G Clark to check availability.





FAN CLUTCHES

F35008HD HEAVY DUTY HT/S REPAIR KIT

FEATURES & BENEFITS

- Standard Temp NBR (Black) D-Ring & O-Ring Seals
- Standard Fine Spline Assy Bearing
- Longer life

APPLICATIONS

- All 9.5" Disc Horton HT/S Clutches
- For heavy duty diesel engines: Singles



F35008SD SUPER DUTY OEM REPAIR KIT

FEATURES & BENEFITS

- OEM Specifications
- High Temp HNBR (Blue) D-Ring & O-Ring Seals
- Higher Temp Outback Fine Spline Assy Bearing
- Longer life
- 30% greater tolerance of temperature extremes
- Less likelihood of spiral fatigue
- Less breakage and leakage
- Extended service life

APPLICATIONS

- Designed for long life and harsh under hood environments
- All 9.5" Disc Horton HT/S Clutches
- Perfect for high run time applications
- For heavy duty diesel engines: B-Doubles & Roadtrains



F35008OB OUTBACK UPGRADE REPAIR KIT

FEATURES & BENEFITS

- Upgrade of OEM Specifications
- High Temp HNBR (Blue) D-Ring & O-Ring Seals
- Higher Temp Outback Fine Spline Assy Bearing
- Longer life
- Red Piston Friction Disc with finned design for increased heat dissipation
- Extended service life

APPLICATIONS

- Designed for high ambient temperature long life and harsh under hood environments
- All 9.5" Disc Horton HT/S Clutches
- Perfect for high run time applications
- For heavy duty diesel engines: B-Doubles & Roadtrains



F35008SOB SEVERE OUTBACK PREMIUM REPAIR KIT

FEATURES & BENEFITS

- Upgrade of OEM Specifications
- High Temp HNBR (Blue) D-Ring & O-Ring Seals
- Higher Temp Outback Fine Spline Assy Bearing
- Longer life
- Green Piston Friction Disc with finned design for increased heat dissipation
- Single Higher Temp Outback DRAC
- Pulley Bearing
- Extended service life

APPLICATIONS

- Designed for long life in high ambient temperatures and harsh under hood environments
- Selected 9.5" Disc Horton HT/S Clutches*
- Perfect for high run time applications
- For heavy duty diesel engines: B-Doubles & Roadtrains
- Premium kit for Severe Outback Duty





F3 FAN CLUTCH SERIES REPAIR KITS

STANDARD
TEMP
BLACK
SEALS

HIGH
TEMP
BLUE
SEALS

HIGH
TEMP
F/SPLINE
BEARINGS

HIGH
TEMP
FINNED
DISC

HIGH
TEMP
DRAC PULLY
BEARING

HD_{F3}
HEAVY DUTY REPAIR KIT



SD_{F3}
HEAVY DUTY OEM KIT



OB_{F3}
OUTBACK UPGRADE KIT



SOB_{F3}
SEVERE OUTBACK PREMIUM



**THE ONLY OPTION FOR
YOUR HORTON FAN CLUTCH**

NORMAN G CLARK
EST. 1919



GENUINE PARTS MADE IN AUSTRALIA



DMA 2-SPEED FAN CLUTCH

High-performance, efficient engine cooling for heavy- and medium-duty trucks, buses and off-highway equipment. Ideal for vocational trucks and applications with little to no ram air.

MAXIMUM RELIABILITY AND LONG OPERATING LIFE

- Premium double-row, angular contact (DRAC) bearing
- Long-wearing air cartridge
- Proven friction liner performance in highest-heat underhood applications
- Fail-safe design

TWO-SPEED FUNCTION FOR EFFICIENT COOLING AND IMPROVED FUEL EFFICIENCY

- Spring actuates at higher temperatures when more cooling is needed

MAXIMUM AVAILABLE HORSEPOWER FOR AUXILIARY SYSTEMS AND REDUCED OPERATING NOISE

- Turns at lower speed in eddy-current mode



NEW DMA 2-SPEED REPAIR KITS

- 2.56" or 5" Pilot
- Includes 5" Adaptor & Studs
- Both Air Caps: Std & Short
- No Set of 4 spacers in 61mm Kit
- Optional Purchase Spacer Kit
- Single Price for All

NGC Part Number	Description	Supersedes Part Number
FQ25230DP	DMA-2S 2.56"/5" Pilot with 30mm DRAC Bearing	FQ25055, FQ25056 Q995617-S
FQ25139DP	DMA-2S 2.56"/5" Pilot with 39mm DRAC Bearing	FQ25031, FQ25033, Q995617, Q995582, 995617, 995582
FQ25261DP	DMA-2S 2.56"/5" Pilot with 61mm DRAC Bearing	FQ25030, FQ25032, Q995617-L



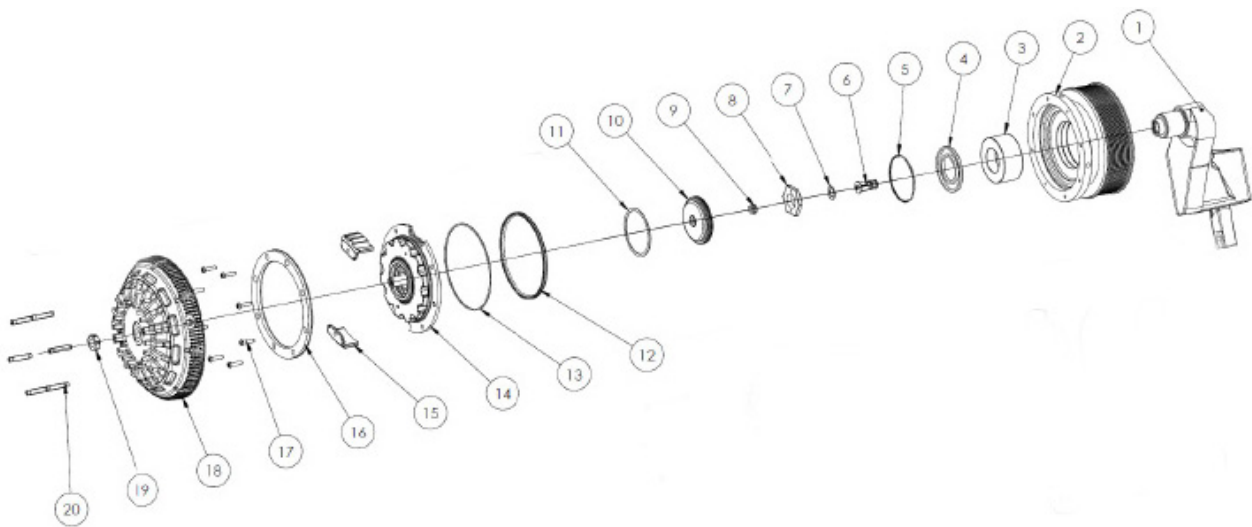
KENWORTH DMA-2S KIT LIST

Kenworth Model	Original OEM Clutch Part No	A/M Clutch Part No	NGC Repair Kit Part No. 1 Kit ONLY	Comments
K108	FDMA81304-2S-4H FDMA81316-2S	FDMA91335-2S	PQ25023DP DMA-2S 2.56"/5" Pilot All 39mm DRAC Bearing No Extra Cap Required Cost Effective Vs General Same Price as FQ25023	OEM P/No Changes due to upgrades
K200 & K220	FDMA81320-2S FDMA81329-2S	FDMA91329-2S		OEM P/No Changes due to upgrades
G509	FDMA81330-2S FDMA81332-2S	FDMA91332-2S		OEM P/No Changes due to upgrades
T360	FDMA81371-2S	FDMA91371-2S		2.56" Pilot





DMA 2-SPEED HORTON FAN DRIVE GENERIC VIEW

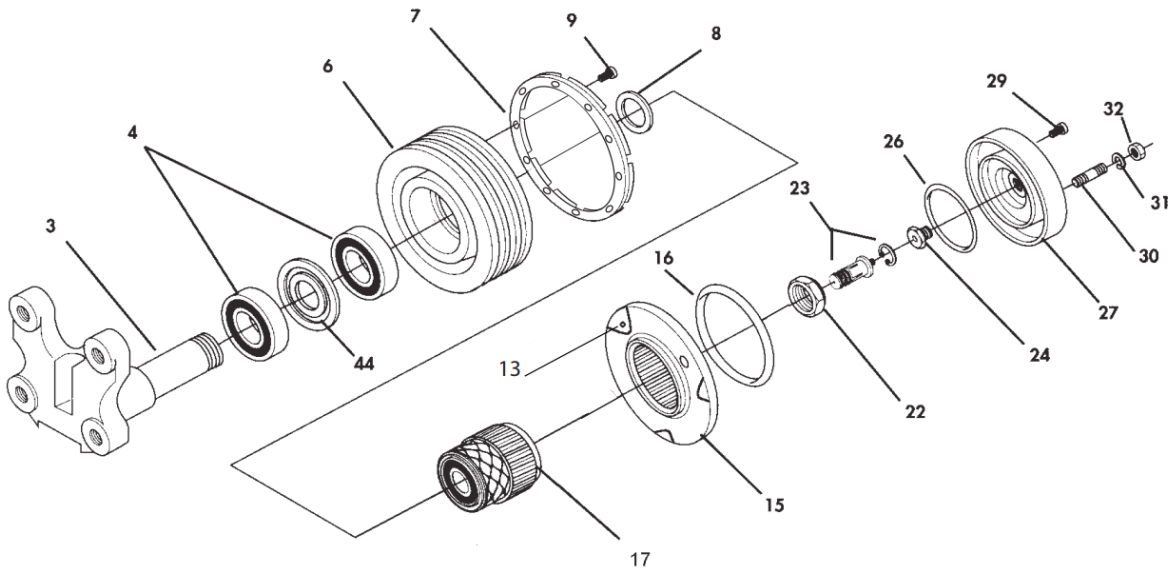


ITEM	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY
1	Journal Bracket	1	11	Retaining Ring (Air Chamber Cap)	1
2	Sheave/Pully	1	12	Quad Cup Seal	1
3	Drac Bearing	1	13	O-Ring Assembly	1
4	Bearing Spacer Set	1	14	Clutch Pack Assembly	1
5	O-Ring Air Chamber Cap	1	15	Dovetail Magnets	2
6	Air Cartridge	1	16	Friction Facing	1
7	Circlip	1	17	Socket Flat Head Screw	8
8	Lock Nut	1	18	Fmfd - Fan Mounting Friction Disc	1
9	Face Seal	1	19	Jam Nut	1
10	Air Chamber Cap	1	20	Studs	6

Scan Here For  HTS & DriveMaster Repair Videos



S & HT/S HORTON FAN CLUTCH GENERIC VIEW



ITEM	DESCRIPTION	QTY	ITEM	DESCRIPTION	QTY
3	Journal Bracket	1	22	Lock Nut	1
4	Pulley Bearings (Match Ground Pair)	1	23	Cartridge Assy (Includes Circlip)	1
6	Pulley/Sheave	1	24	Face Seal	1
7	Friction Facing (Sintered Bronze)	1	26	O-Ring 'Small'	1
8	Journal Spacer (1/4" Or 3/4")	1	27	Air Chamber 2" Pilot	1
9	Socket Flat Head Screws	8	29	Socket Head Screws (Air Chamber)	8
13	System Sentry (Note: LH Thread)	1	30	Stud	6
15	Piston Friction Disc Assembly	1	31	Washer	6
16	D-Ring 'Large'	1	32	Nut	6
17	Fine Spline Hub Assembly	1	44	Set Of Bearing Spacers (On Some Models)	1

Scan Here For **HORTON** HTS & DriveMaster Repair Videos

BY NORMAN G CLARK





HT/S KYSOR CONVERSION KITS

Norman G. Clark have developed a range of Horton HT/S Conversion Kits which will bolt straight in to replace the existing or factory fitted Kysor and/or Horton DMA-2S fan clutch.

The kits will include a new Horton HT/S Fan Clutch and Solenoid-Filter assembly for the HT/S Conversion. The new HT/S Fan Clutch will have a Ø2.56" pilot to use the existing fan.

The benefits of the Horton HT/S are that it has a lock-up facility and that spare parts are manufactured and supported locally through Norman G. Clark. These HT/S kits also allow fleets to convert all their USA trucks to one clutch type and streamline their spare parts.

Refer to table below to determine correct NGC HT/S Conversion Kit required:

	Model Engine Kysor OEM Part No.	Kysor OEM Part No.	Horton OEM DMA-2S Part No	NGC Outback DMA-2S Part No.	NGC HT/S Conversion Kit	
Western Star	WST 4800/4900 (& 6900)	ISX	010024142	98A9569-2	FDMA91342-2S	FHK91342SD
	WST 4800/4900 (& 6900)	DDI3/I5	010023623 010032433 (200mm)	98A9570-2	FDMA91506-2S (200mm)	FHK91506SD
Freightliner	Argosy	DDI3/I5		98A9779-2	FDMA91503-2S	FHK91503SD
	Argosy	ISX		98A9778-2	FDMA91336-2S	FHK91336SD
	Coronado	DDI5	010023866 010023867	98A8621-2 98A8262	FDMA91504-2S	FHK91504SD
	Century Class CSTII2	DDI3	010023622 010026148 010032450	98A9746 98A8266	FDMA91505-2S	FHK91505SD

The part numbers remain constant for easy recognition for each application however they now have the HT/S suffix and prefix.

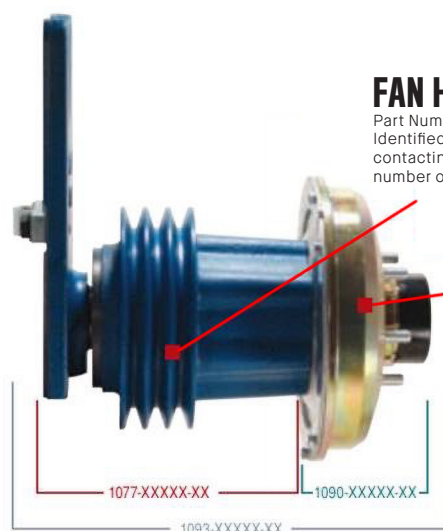
The conversion kit will include the HT/S clutch and solenoid with fittings for conversion from Kysor Clutch to Horton HT/S, and 2.56" piloted spacer or re-use existing OEM fan.



KYSOR CLUTCH REPAIR OR REPLACEMENT

BorgWarner on/off rear air fan clutch assemblies are two-piece systems. The first piece is the Fan Hub, which consists of an assembled pulley and mounting bracket. The second piece is the Fan Clutch, which turns on and off to engage the fan when cooling is required. (Most part numbers start with 1077, 1093, or 1090, but some newer hubs and assemblies start with 0100.)

Part number 1093-XXXX-XX refers to an entire BorgWarner-Style fan clutch assembly. It is for reference purposes only and not available for ordering. The cross-reference guide that begins on the following page will break the assembly down into two part numbers for you to order (the Fan Hub number and Fan Clutch number). If you are only replacing the Fan Clutch portion, you should also consider replacing the pulley bearings.



FAN HUB

Part Number 1077-XXXX-XX
Identified by tag on bracket or by contacting us with the casting number on bracket

FAN CLUTCH

Identified by tag on clutch or by using cross-reference based on Fan Hub part number,



KLONDIKE FAN DRIVE REPAIR KITS

REPLACEMENT FAN CLUTCHES FOR KYSOR® K26RA & REPAIR KITS FOR K26RA AND K26FA

The Klondike includes a replacement fan clutch for Kysor K26RA; K26RA Major Kits, K26 Seal Kits and Lining Kits for repairing Kysor K26 rear- or front-air fan clutches; and five Hub Bearing Kits.

With Klondike Series products, you get guaranteed on-time delivery and the reliable industry-leading support you need to keep your fleet running smoothly.

- Horton quality and reliability
- Reliable industry-leading support

- Interchangeable with original equipment fan clutches and parts.
- Fan clutch replacement engages without air pressure to keep the engine cool

APPLICATIONS

- Medium & Heavy -duty trucks
- Buses



HORTON KLONDIKE SERIES KYSOR CLUTCH REPAIR

NGC Part No.	Description	OEM Part No.	Crossreference Part No.	Picture
F850002	Horton Klondike K32 Rear Air Dual Pilot Fan Clutch (Supersedes F850001)	1090-08500-01, 1090-09500-01B, 1090-09650-01B, 1090-09900-01B, 1090-09900-01, 1090-09600-01B, 1090-09950-01B, 1090-09750-01B, 1090-09500-01, 1090-09600-01, 1090-09650-01, 1090-09650-01B, 1090-09750-01	International 2602141C91, International 2509380C91, International 2514343C91, Kit-Masters 8905N, Kit-Masters 8805X, Kit-Masters 8901X, Kit-Masters 8801X, Kit-Masters 8801N, Kit-Masters 8801, Mack 85114233, Mack 8511808, Mack 85108716	
F860001	Horton Klondike Front Air Fan Dual Pilot Fan Clutch	1090-07050-01, 1090-05262-01, 1090-06620-01, 1090-06060-02, 1090-06060-03, 1090-08000-05, 1090-07050-03, 1090-09000-05, 1090-09000-05A, 1090-06620-02, 1090-05261-02, 1090-08601-02, 1090-09000-01,	Kit-Masters 8001N, Kit-Masters 8001X, Kit-Masters 8005X	



RCV250 FULLY VARIABLE FAN DRIVES

Lighter with a compact design, RCV250 Fully Variable Fan Drives are engineered to turn larger fans that require higher torque. The RCV250 is an integrated belt-driven fan drive that can be mounted in various locations to eliminate the vibration inherent in traditional driveshaft-mounted fan drives.

- Fully variable speed control reduces operating noise, lowers fuel costs and provides cold weather performance advantages
- Compact and lighter weight vs. competition with Horton's one-piece design for ease of installation

- Industry-leading, double row, angular contact (DRAC) bearing for increased durability and product life
- Maintenance free
- Innovative design provides for faster response time and lower off-speed decreasing parasitic loss to preserve horsepower and provide effective cooling
- Unexposed control harness means no drive replacement if belt breaks
- Smooth fan engagements and fan modulation
- No friction liners or wear parts to replace



DUAL SPEED RCV250 VISCOUS FAN DRIVE CONVERSION KITS

Application	Original Clutch Part Number	RCV250 Conversion Kit Part Number
Western Star 4800 / 4900 with DDI5	98A9570-2 / FDMA9I506-2S	FCMK9I506
Western Star 4800 / 4900 with Cummins ISX	98A9569-2 / FDMA9I342-2S	FCMK9I342
Freightliner Argosy with DDI5	98A9779-2 / FDMA9I503-2S	FCMK9I503
Freightliner Coronado with DDI5	98A862I-2 / FDMA9I504-2S	FCMK9I504
Freightliner Argosy with Cummins ISX	98A9778-2 / FDMA9I336-2S	FCMK9I336

- Kit to convert pneumatic fan clutches to viscous Dual Speed clutch for longer service life
- Kit includes RCV250 fan clutch, Fan and Wiring Loom to operate clutch from existing solenoid signal
- No other programming changes required.



FANS

- HORTON & ACS FANS
- 8/9/11 BLADE
- Features & Benefits
- Various Fan Diameters
24in - 32in
- Various Pilot Diameters
2.0in / 2.56in / 5.0in
- Multiple Plate Positions:
Flat Plate, Dished Forward & Dished Rearward
- Pusher & Sucker fans
- Can retro-fit Borgwarner/Kysor/Behr-Mahle fans



For all Horton Clutch Repairs, HT/S or DMA, an Air Decay test is critical to ensure all seals are seated properly and there are no air leaks to ensure the clutch is functioning correctly for greatest durability.

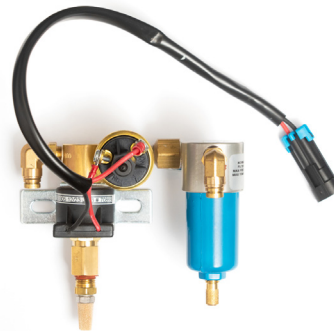
Note: For correct analysis the whole fan clutch system should be checked for air leaks and correct function prior to refitment to prevent a repeat failure and ensure maximum clutch life.



PRESSURE PROTECTION KITS

To be used for Air On – Fan Off Clutches such as Drivemaster and Drivemaster 2-Speed.

Kit supplied with a solenoid, filter and pressure switch. The solenoid will not open until 90psi air pressure is detected. This keeps the fan On and protects the clutch from slipping caused by low pressure.



INDEX HEAVY DUTY PRESSURE SWITCHES

Index Heavy-Duty Pressure Switches are ideal for a wide range of heavy vehicle and equipment applications where durability and reliability are crucial.

Index switches are proven to withstand the shock and vibration of harsh underhood and off-road conditions.

Solving the Challenges of Demanding Applications

- Exceptional vibration resistance.
- Specially designed for long life on heavy-duty equipment; up to 1,000,000 cycles.

- Special time delay and diagnostic features available.
- Pressure indication, interlock, and control for engines, transmissions, hydraulics, fluid tanks, and similar industrial applications.
- Broad media compatibility: air, oil, water, coolant, hydraulic fluid, transmission fluid, and more.
- Custom-specifiable set and reset pressures.
- Tight tolerances where high precision is needed. Stable, drift-free calibration.
- Choice of fittings and connectors.



SOLENOID FAN DRIVE CONTROLS

- Designed for all vehicle cooling applications
- Designed for excessive heat and vibration
- Developed for the most extreme underhood applications
- Toughest valve on the market
- The solenoid valve is the key to proper

- fan drive operation
- Available in 12V & 24V
- Solenoid valve and filter sold separately in universal kit
- Fully assembled kits also available





HTEC FANS

Horton Thermoset Engineered Composite

**Increased Airflow Versus
Comparable Metal Fans**

Reduced Fuel Consumption

**Higher Speed Rating Than
Comparable Metal Fans**

OEM Approved

**Compatible With
All Fan Drives**

Best in Class Durability

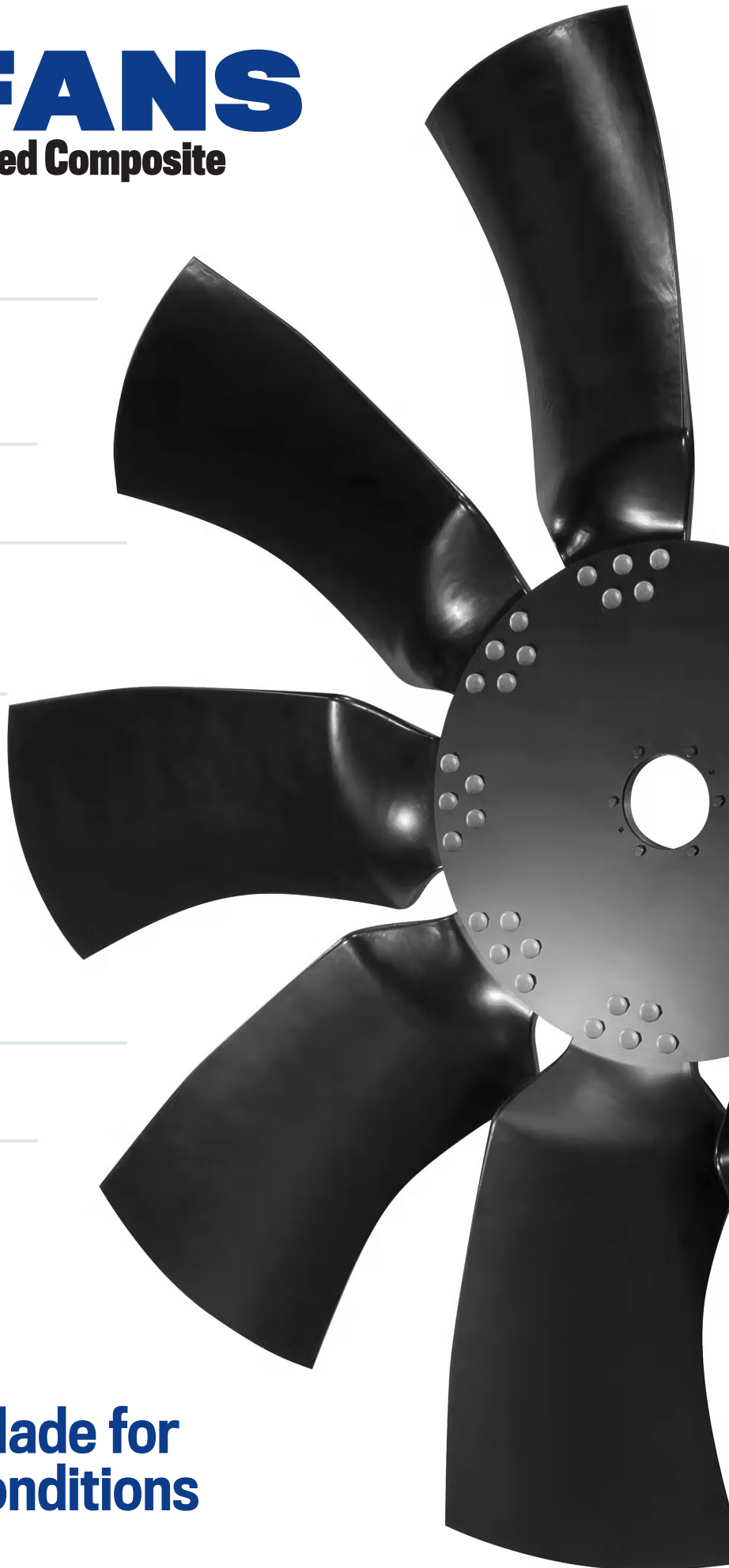
Significant Noise Reduction



**WATCH
THE VIDEO
← HERE**



**Australian Made for
Australian Conditions**



HTEC1800 SERIES FAN

Thermoset composite provides for metal like strength but efficiency of moulded nylon. High speed ratings with low noise and corrosion resistant properties.

Available diameter range: 1,194 – 1,829 mm [47" – 72"]

Diameter	47"-72" 1194-1829 mm
Pilots and Mounting	Standard and customizable mounting available, including straight and tapered bores
Weight	17kg / 30lbs and up
Max Tip Speed	112m/sec 22,000 ft/min



HTEC2500 SERIES FAN

Thermoset composite provides for metal like strength but efficiency of moulded nylon. High speed ratings with low noise and corrosion resistant properties.

Available diameter range: 1,651 – 2,438 mm [65" – 96"]

Diameter	65"-96" 1651-2438mm
Blade Configurations	5 to 17
Pilots and Mounting	Standard and customizable mounting available, including straight and tapered bores
Weight	41kg / 90lbs and up
Max Tip Speed	112m/sec 22,000 ft/min



FAN CROSS REFERENCE LIST

Norman G. Clark currently have HTEC designs for several Off-Road Makes and Models as listed.

CUSTOM FANS

If you have a specific application not listed please speak with a Norman G. Clark representative as we can design and assemble a HTEC fan in Australia that best suits your application and needs: be it increased durability, improved air flow and efficiency and/or reduced fan noise.

APPLICATION	MAKE	MODEL	OEM P/N
HAUL TRUCK	CAT	776, 777, 777C, 777D, 777B, 777F	4N-4030
	CAT	785C, D 789, 789B	110-2740
	CAT	785D	510-7285
	CAT	789C, 793C	110-2735
	CAT	789D	362-7762
	CAT	793D II BLADE	196-9172
	CAT	793D I3 BLADE	290-9751
	CAT	793F	317-2744
	CAT	795F	175-5280
	HITACHI	EH5000AC2 MTU	E12644139
	HITACHI	EH5000AC3 MTU	4673206
	KOMATSU	960E	PC0665
	KOMATSU	HDI500-8	562013A310
	KOMATSU	830E MTU	PC0210
	KOMATSU	HD785-7	600-645-7450
	LIEBHERR	T264	10339533
	LIEBHERR	T282B, T282C	13074-M
EXCAVATOR	TEREX	MT4400 68"	468-5928
	TEREX	MT4400 77"	468-5929
	TEREX	MT6300	530-0073
	CAT	6060 OIL COOLER	534-9216
	CAT	6060 ENGINE FAN	485-9267
WHEEL LOADER	CAT	6090 OIL COOLER	533-8738
	CAT	6090 ENGINE FAN	533-9967
	LIEBHERR	996 ENG FAN	5611091
	CAT	994D, 994F, 994H	110-4377

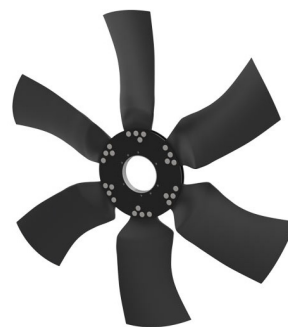


HM1400 SERIES FAN

The HM1400 fan utilizes the optimized blade design of the HTEC fan family while providing the reduced weight of the proven Horton nylon. This combination allows efficient, customizable performance to meet your cooling needs in mid-range fan diameters.

FEATURES & BENEFITS

- Increased airflow and efficiency
- Optimized blade design
- Lightweight durable blades
- Flexible design for most any application
- Available in a variety of blade counts and center-disk diameters
- Highly compatible with Horton and competitive fan drives



MODULAR FANS

Windshift™ Fans

Innovative clamshell knuckles attachment system provides flexibility in terms of pitch angles and three different blade shapes for optimized performance. Available diameter range: 610 – 1,320 mm [24" – 52"]



Shogun Modular Fans

Ideal for reduced-emission engines with flexibility in terms of blade counts and bolt circles fastened by rivets to a durably-constructed centre disk. Available diameter range: 406.4 – 559 mm [16" – 22"]

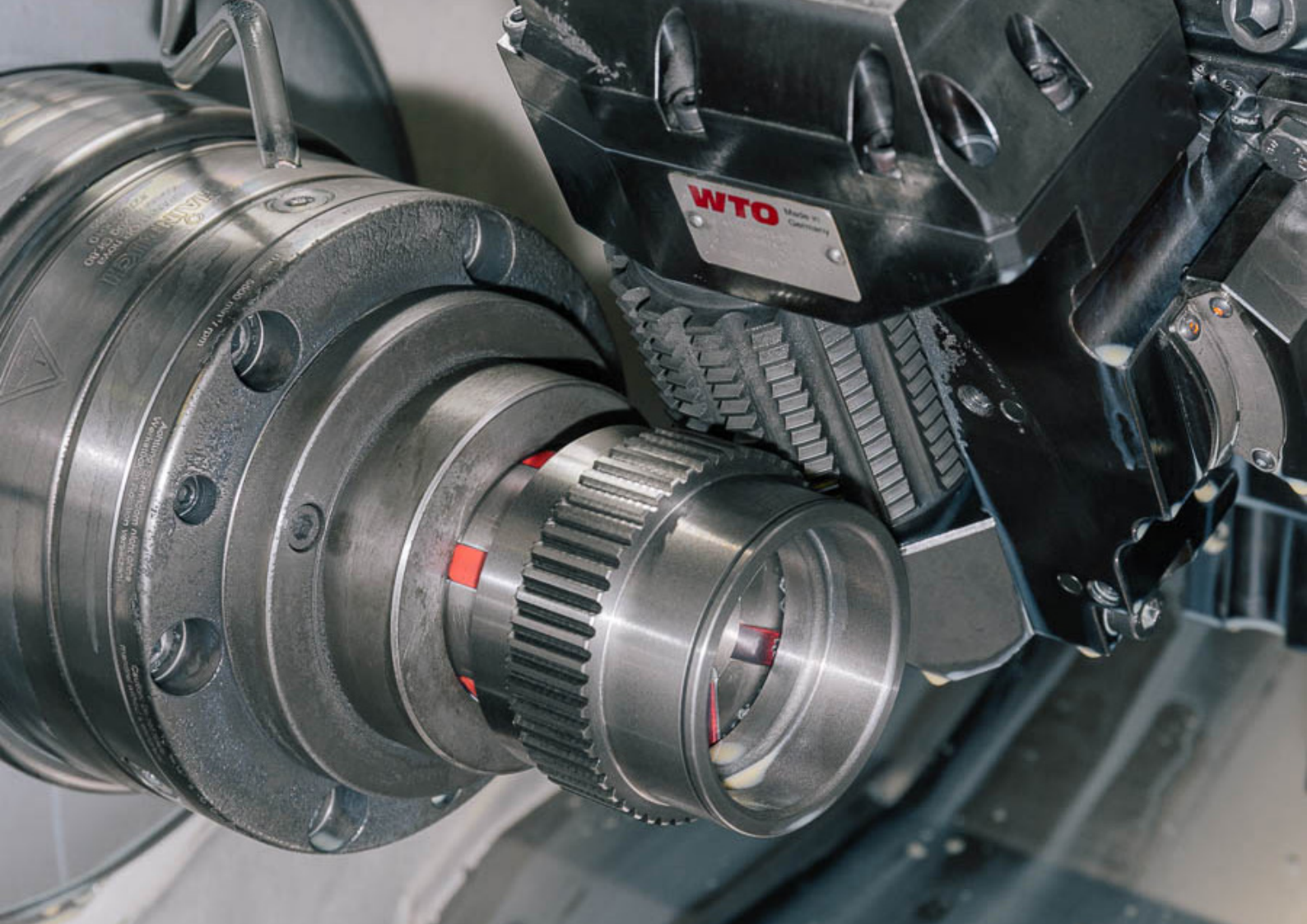


Metal Standard Fans

Highly customisable, with multiple blade configurations in steel or aluminum. Available diameter range: 254 – 2,438 mm [10" – 96"]







NORMAN G CLARK

EST. 1919

BRANDS

nexen.

HORTON

DEUBLIN
Rotating Unions

G
oblan

NETT
TECHNOLOGIES INC.

PARATECH

Erhardt+Leimer **EL**

IBD **WICKELTECHNIK**
well engineered

Suco

OGURA
INDUSTRIAL CORP.

SCHLUMPF USA

**FLIGHT
SYSTEMS**

INSULFLEX
Solving high temperature problems worldwide

MINER
ELASTOMER
PRODUCTS CORPORATION

Ralphs-Pugh Co

Imbiber Beads

INDEX
SENSORS & CONTROLS

American Cooling Systems
ACS

MEROBEL

**REDEX
ANDANTEX**

ZAP OFF
ANTI-STATIC

Expello

NORMAN G CLARK
WATER TREATMENT CONSULTING

PACTENE



NORMAN G CLARK

EST. 1919

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