

V20EH Open-Center Directional Control Valve

Build Program

Bulletin HY14-2733-B1/US

Refer to PL HY14-2700/US
for current pricing information

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electromechanical
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Technical Information

General Description..... 1

Operation..... 1

Benefits 2

Assembly Callout Drawing..... 2

Specifications 3

Weights..... 3

Connections 3

Ordering Information

Inlet 4

Mid-Inlets..... 4

Main Relief Options 4

Outlet 4

Stud Assembly Kits..... 5

Utility Sections..... 5

Work Section, Standard..... 6

Work Section, Handle Override 6

Work Section, Single Ended..... 7

Accessories 8

V20 Solenoid Options..... 8

Offer of Sale II

Safety Guide II

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General Description

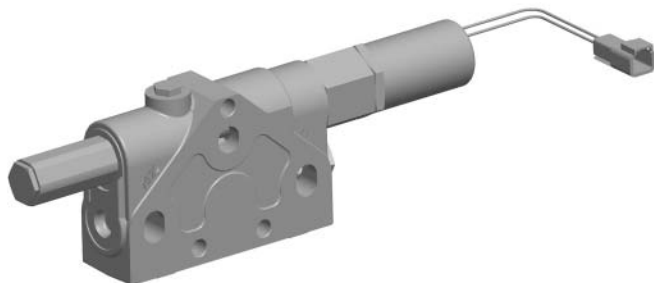
The V20 has been a strong and reliable player in the 75-100 LPM (20-26 GPM) open-center, directional control valve market for many years. Now it has a new, electrohydraulic package designed for open-center systems and for those customers wanting to take machine control to the next level.

The offering consists of the following:

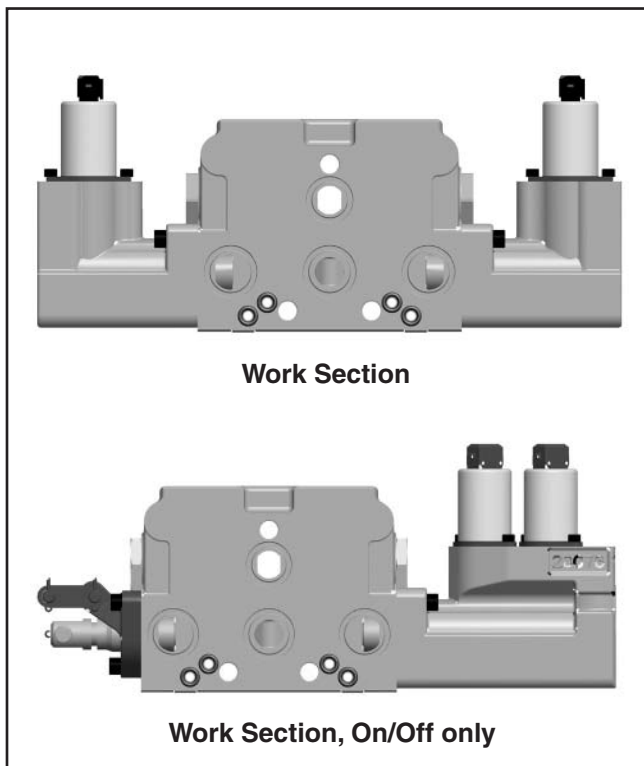
- A global solenoid (pwm) that can be used for proportional or on/off control. The coils have a molded on Amp Jr. or Deutsch connector.
- Work sections rated to 240 Bar (3500 PSI): 4-way, 3-position; and 3-way, 3-position.
- A pilot generating/regulating section that is referred to as a “utility section”. The purpose of this section is to generate and regulate pilot pressure in an open-center circuit. This section is to be placed adjacent to the outlet cover.



Solenoid (1 piece)



Utility Section



Work Section

Work Section, On/Off only

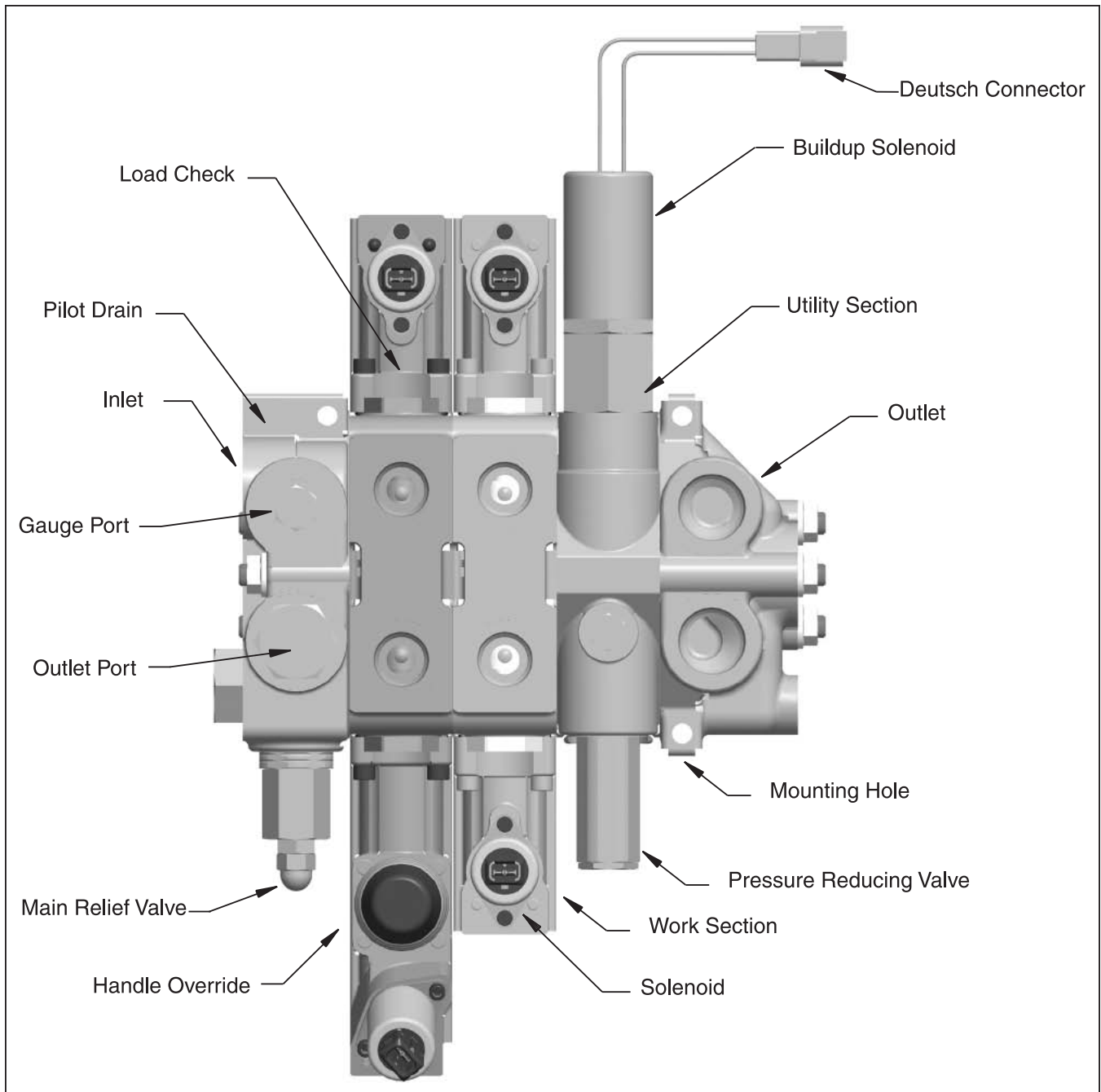
Operation

Open-center valves that are operated by either hydraulic-remotes or electrohydraulics require a way to generate and regulate the pilot pressure. For hydraulic-remote operation, the regulated pilot pressure is needed for the pilot controllers. For electrohydraulic operation, the regulated pilot pressure is required for the work section solenoids. Generation and regulation of the pilot signal can be accomplished externally with an in-line solution, however, this approach requires extra plumbing.

The V20 has an integrated section that selectively generates and regulates the pilot pressure to be sent to the hydraulic-remote controllers, or the solenoids installed in the work section.

When an operator selects a spool, a signal is sent to a normally open solenoid in the “utility” section. Pressure will then build until it reaches the setting of the buildup cartridge. This is sufficient pressure to move the main spool, so that it can be connected to the load pressure. At that point, the inlet of the valve will see system pressure, and the pressure-reducing valve in the “utility section” will regulate the pilot pressure to the hydraulic-remote controllers or the work section solenoids.

For electrohydraulic operation, optimizing machine control is achieved by having a dedicated drain for the work section solenoids. Therefore, the V20EH package isolates the solenoid within the control valve, and the solenoid drain port is located in the inlet.



Benefits

- The pressure required to move the spools is generated and regulated internal to the V20 valve. This eliminates the need for any in-line devices and the associated plumbing which saves installation cost.
- Minimal impact on open-center pressure drops when the main spools are in neutral. This is because pressure generation is "triggered" to on, only when a spool is selected. The benefit is less heat generation and reduced fuel consumption.
- Minimal impact on loop pressure drops: P-A/B and A/B-T which maximizes horsepower utilization.
- There is an option to have the mechanical buildup for full on-time operation, useful in many applications where the PTO is engaged only when work is to be done.
- A dedicated solenoid drain to the reservoir optimizes solenoid performance. This translates into consistent metering and machine controllability.
- An extended bonnet for screw-adjustable work port relief valves in an option available for those applications requiring this type of adjustable pressure control (consult factory).
- Handle with manual override.

Specifications

Pressures	Pump Inlet Ports: 240 Bar (3500 PSI) Service Ports: 276 Bar (4000 PSI) Pilot: 35 Bar (508 PSI) (input or internal supply) Tank Return Ports: 15 Bar (220 PSI) Solenoid Drain: 2 Bar (29 PSI)
Flow Rates (maximum recommended)	95 LPM (25 GPM)
Leakage Performance	Mineral oil, 100 SUS @ 49°C (120°F) @ 69 Bar (1000 PSI) 12 cc/min with no port accessories 22 cc/min with an RV or RV & AC
Hydraulic Fluid	Mineral Base oil For other fluids, consult factory Viscosity, working range: 15-380mm ² /s (15-380 cSt)
Hydraulic Oil Temperature	Recommended Operating Range without Solenoid Operation: -30° to 90°C (-22 to 194°F) Recommended Operating Range with Solenoid Operation: -20° to 80°C (-4 to 176°F)
Filtration (ISO4406)	20/18/14 in Main Flow Paths 18/16/13 Pilot Supply

Weights

Inlet with relief	3.5 kg (7.8 lbs)
Work section – manual spring return	4.4 kg (9.7 lbs)
Work section – hydraulic remote	4.5 kg (9.9 lbs)
Work section – solenoid operated	6.2 kg (13.6 lbs)
Work section – pilot generation	4.1 kg (9.1 lbs)
Add for port relief	0.1 kg (0.2 lbs)
Outlet	1.5 kg (3.4 lbs)

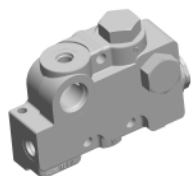
Solenoid Specifications

Voltage	12 or 24 VDC
Frequency	100 ±10 Hz
Pilot	35 Bar (508 PSI) 15-23 LPM (4-6 GPM)
Current Input (I)	1.5A for 12 VDC 0.75A for 24 VDC
Current (mA) for Spool Shift	12V 24V
Start Shift	400 200
Full Shift	1200 600
Insulation Material	Class H
Duty Cycle	100%
R20 Ohm	4.72 (±5%) for 12 VDC 20.82 (±5%) for 24 VDC
Fluid Cleanliness	17/14 per ISO 4406
Ambient Temperature	-30° to 80°C (-22 to 176°F)
Fluid Temperature	-20° to 80°C (-4 to 176°F)

Connections

O-ring boss ports SAE-J1926-1
BSPP ports ISO 1179-1

Description	SAE#	O-ring boss	BSPP
Inlet Port, Top or Side	12	1-1/16"-12 UNF	3/4"-14
Outlet Port, Top or Side	12	1-1/16"-12 UNF	3/4"-14
Work Ports	12	1-1/16"-12 UNF	3/4"-14
Work Ports	10	7/8"-14 UNF	1/2"-14



V20EH Inlet Covers

Product Code	Part Number	Side HP	Side LP SAE-12	Top HP	Top LP SAE-12	Pilot Drain SAE-6 End
20-LC-12-EH	28194501	SAE-12	X	SAE-6	X	X
20-LC-12T-EH	28194502	SAE-6	X	SAE-12	X	X

- NOTES:**
1. See main relief options below.
 2. The top HP port has a steel plug with an SAE-4 gage port.
 3. The top LP port has a steel plug.



V20EH Mid-Inlet Sections

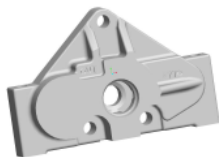
Product Code	Part Number	Combined Flow	Split Flow	HP SAE-12 Top
20-12-SF-EH	28194451		X	X
20-12-CF-EH	28194401	X		X

- NOTES:**
1. Connects pilot and drain passages between upstream and downstream work sections.
 2. See main relief valve options below.

V20EH Main Relief Options

Product Code	Part Number	500-1249 PSI	1250-1749 PSI	1750-1999 PSI	2000-2599 PSI	2600-3200 PSI	500-3500 PSI	No R/V Option
WH-1200	08650417	X						
WH-1700	08650418		X					
WH-1950	08650419			X				
WH-2550	08650420				X			
WH-3000	08650398					X		
RP51A-3000	RP51A-3000						X	
K-20-NR	08650382							X
K-WH-A	08650381							

External Screw Adjustable Option for WH Relief



V20EH Outlet Covers

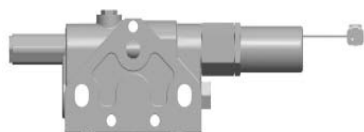
Product Code	Part Number	Side LP SAE-12
20-RC-12-EH-E	28194602	X

- NOTE:** 1. Contact factory for power beyond options.

V20EH Section Stud Assembly Kits

Product Code	Part Number	With Utility Section	Without Utility Section (4)
K-20-EH-1	28194701	–	One Section
K-20-EH-2	28194702	One Section	Two Sections
K-20-EH-3	28194703	Two Sections	Three Sections
K-20-EH-4	28194704	Three Sections	Four Sections
K-20-EH-5	28194705	Four Sections	Five Sections
K-20-EH-6	28194706	Five Sections	Six Sections
K-20-EH-7	28194707	Six Sections	Seven Sections
K-20-EH-8	28194708	Seven Sections	Eight Sections
K-20-EH-9	28194709	Eight Sections	Nine Sections

- NOTES:**
1. Kits include studs, face seals and nuts.
 2. Remember to add the utility section to the section count.
 3. Stud torque is 28 ft-lb.
 4. For external pilot applications.



V20EH Pilot Generating Utility Sections

Product Code	Part Number	12V (Note 3)	Deutsch Connector	8" Lead Wires	Pilot Pressure Always "On"
20-UT-EH-12	28194913	X		X	
20-UT-EH-12-D	28194912	X	X		
20-UT-EH-MECH	28194901				X
20-UT-EH-CC	Contact factory for closed center applications.		X		
20-UT-EH-PB	Contact factory for power beyond applications.				
K-20-EH-EP	See note below for external pilot bonnet kits.				

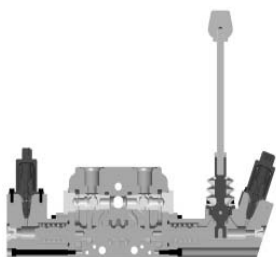
- NOTES:**
1. Utility section must be stacked directly adjacent (upstream) to the outlet cover.
 2. Solenoid has 6" lead wires terminated with Deutsch DT04-2P receptacle with pin terminals.
 3. For 24V applications, please consult factory.
 4. Use K-20-EH-EP, when a regulated external pilot signal is available.
One bonnet per side must have pilot pressure for the bank to operate. Kit contains both bonnets.
 5. Pilot pressure factory set @ 500 PSI.



V20EH Parallel Work Sections (Housing 10954) - 12V Solenoid

Product Code	Part Number	3-Way 3-Pos	4-Way 3-Pos	4-Way 3-Pos Free Flow	SAE 10 Ports	SAE 12 Ports	Amp Jr.	Amp Jr. w/Pin Override	Deutsch
20-10-03-EH-12-A1	28194201	X			X		X		
20-12-03-EH-12-A1	28194202	X				X	X		
20-10-04-EH-12-A1	28194203		X		X		X		
20-12-04-EH-12-A1	28194204		X			X	X		
20-10-F4-EH-12-A1	28194101			X	X		X		
20-12-F4-EH-12-A1	28194102			X		X	X		
20-10-03-EH-12-A2	28194205	X			X			X	
20-12-03-EH-12-A2	28194206	X				X		X	
20-10-04-EH-12-A2	28194207		X		X			X	
20-12-04-EH-12-A2	28194208		X			X		X	
20-10-F4-EH-12-A2	28194103			X	X			X	
20-12-F4-EH-12-A2	28194104			X		X		X	
20-10-03-EH-12-D	28194209	X			X				X
20-12-03-EH-12-D	28194210	X				X			X
20-10-04-EH-12-D	28194211		X		X				X
20-12-04-EH-12-D	28194212		X			X			X
20-10-F4-EH-12-D	28194105			X	X				X
20-12-F4-EH-12-D	28194106			X		X			X

- NOTES:**
1. These work sections can be used as ON/OFF or proportional depending on the signal input to the solenoids.
 2. For 24V applications, please consult factory.
 3. All bonnets are machined to accept the standard spool travel limiter/manual override kits.



V20EH Parallel Work Sections (Housing 10954) Handle Override - 12V Solenoid

Product Code	Part Number	3-Way 3-Pos	4-Way 3-Pos	4-Way 3-Pos Free Flow	SAE 10 Ports	SAE 12 Ports	Amp Jr.	Deutsch
20-10-03-EH-12-A1-HRO	28194241	X			X		X	
20-12-03-EH-12-A1-HRO	28194242	X				X	X	
20-10-04-EH-12-A1-HRO	28194243		X		X		X	
20-12-04-EH-12-A1-HRO	28194244		X			X	X	
20-10-F4-EH-12-A1-HRO	28194121			X	X		X	
20-12-F4-EH-12-A1-HRO	28194122			X		X	X	

20-10-03-EH-12-D-HRO	28194245	X			X			X
20-12-03-EH-12-D-HRO	28194246	X				X		X
20-10-04-EH-12-D-HRO	28194247		X		X			X
20-12-04-EH-12-D-HRO	28194248		X			X		X
20-10-F4-EH-12-D-HRO	28194123			X	X			X
20-12-F4-EH-12-D-HRO	28194124			X		X		X

- NOTES:**
1. These work sections can be used as ON/OFF or proportional depending on the signal input to the solenoids.
 2. For 24V applications, please consult factory.
 3. All bonnets are machined to accept the standard spool travel limiter/manual override kits.
 4. Note that the travel limiter/manual override for each side is different. Both are listed in the accessories.



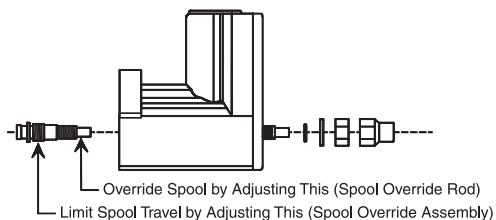
V20EH Parallel Work Sections (Housing 10954) Single Ended - 12V Solenoid

Product Code	Part Number	3-Way 3-Pos	4-Way 3-Pos	4-Way 3-Pos Free Flow	SAE 10 Ports	SAE 12 Ports	Amp Jr.	Deutsch
20-10-03-EH-12-A1-SE	28194213	X			X		X	
20-12-03-EH-12-A1-SE	28194214	X				X	X	
20-10-04-EH-12-A1-SE	28194215		X		X		X	
20-12-04-EH-12-A1-SE	28194216		X			X	X	
20-10-F4-EH-12-A1-SE	28194107			X	X		X	
20-12-F4-EH-12-A1-SE	28194108			X		X	X	

20-10-03-EH-12-D-SE	28194217	X			X			X
20-12-03-EH-12-D-SE	28194218	X				X		X
20-10-04-EH-12-D-SE	28194219		X		X			X
20-12-04-EH-12-D-SE	28194220		X			X		X
20-10-F4-EH-12-D-SE	28194109			X	X			X
20-12-F4-EH-12-D-SE	28194110			X		X		X

- NOTES:**
1. These work sections can only be used as ON/OFF.
 2. The standard clevis and handle bracket are present on the front side of the valve.
 3. For 24V applications, please consult factory.

Solenoid End Cap Spool Travel Limiter and Spool Overrides



V20EH Accessories

Product Code	Part Number	Description
K-20-TL-MO-S	13650081	Screw type travel limiter/manual override. Note 1
K-20-TL-IH	13650937	Screw type travel limiter for handle side on handle override sections. Note 2
K-20-EH-EP	28194727	External pilot bonnet kit. Note 3
K-20-CONT-ON	08650430	Utility Section Mechanical Pressure control cartridge.
K-20-12-CNTRL	13650938	Utility Section 12V Pressure control cartridge.
K-20-24-CNTRL	13650939	Utility Section 24V Pressure control cartridge.

- NOTES: 1. These override kits will not fit into the Single Ended (SE) sections.
2. Use this kit for the Handle Override side of the valve only, use K-20-TL-MO-S for the opposite side.
3. Two bonnets are included in this kit.



V20EH Solenoid Options

Product Code	Part Number	12V	24V	Amp Jr	Amp Jr w/Manual Override	Deutsch
20-EH-12-A1	28194720	X		X		
20-EH-12-A2	28194721	X			X	
20-EH-12-D	28194722	X				X
20-EH-24-A1	28194723		X	X		
20-EH-24-A2	28194724		X		X	
20-EH-24-D	28194725		X			X
K-20-A1-LW	28194726	Amp Jr connector with 8" long lead wires. Note 1				

NOTE: This is a mating connector to the Amp Jr Coils with 8" leads.

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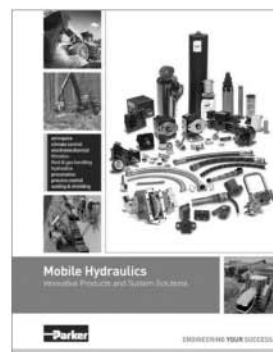
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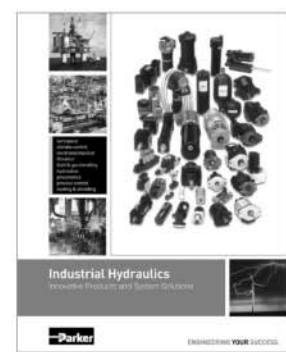
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