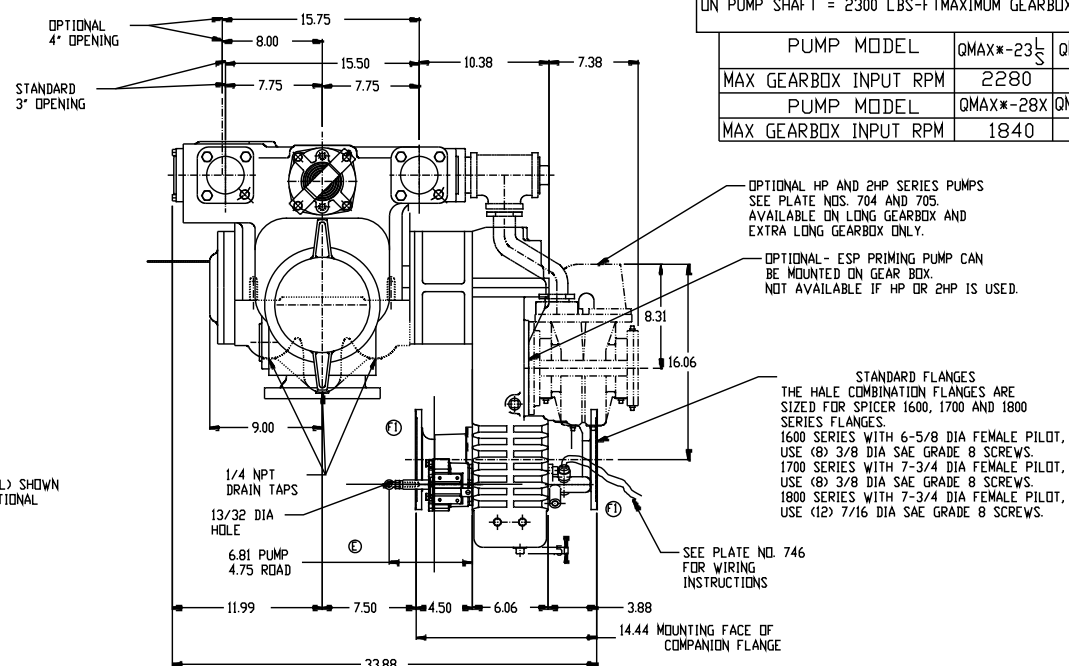
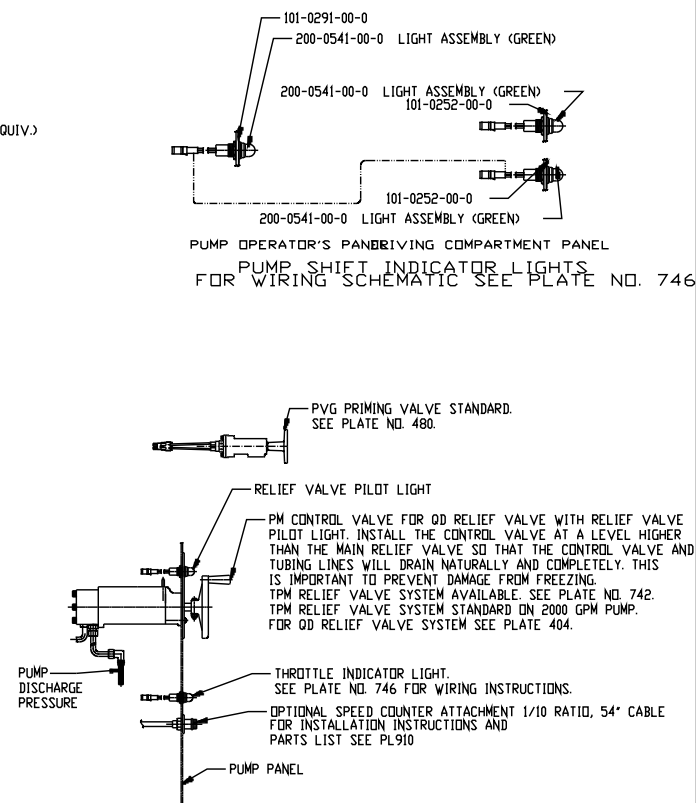
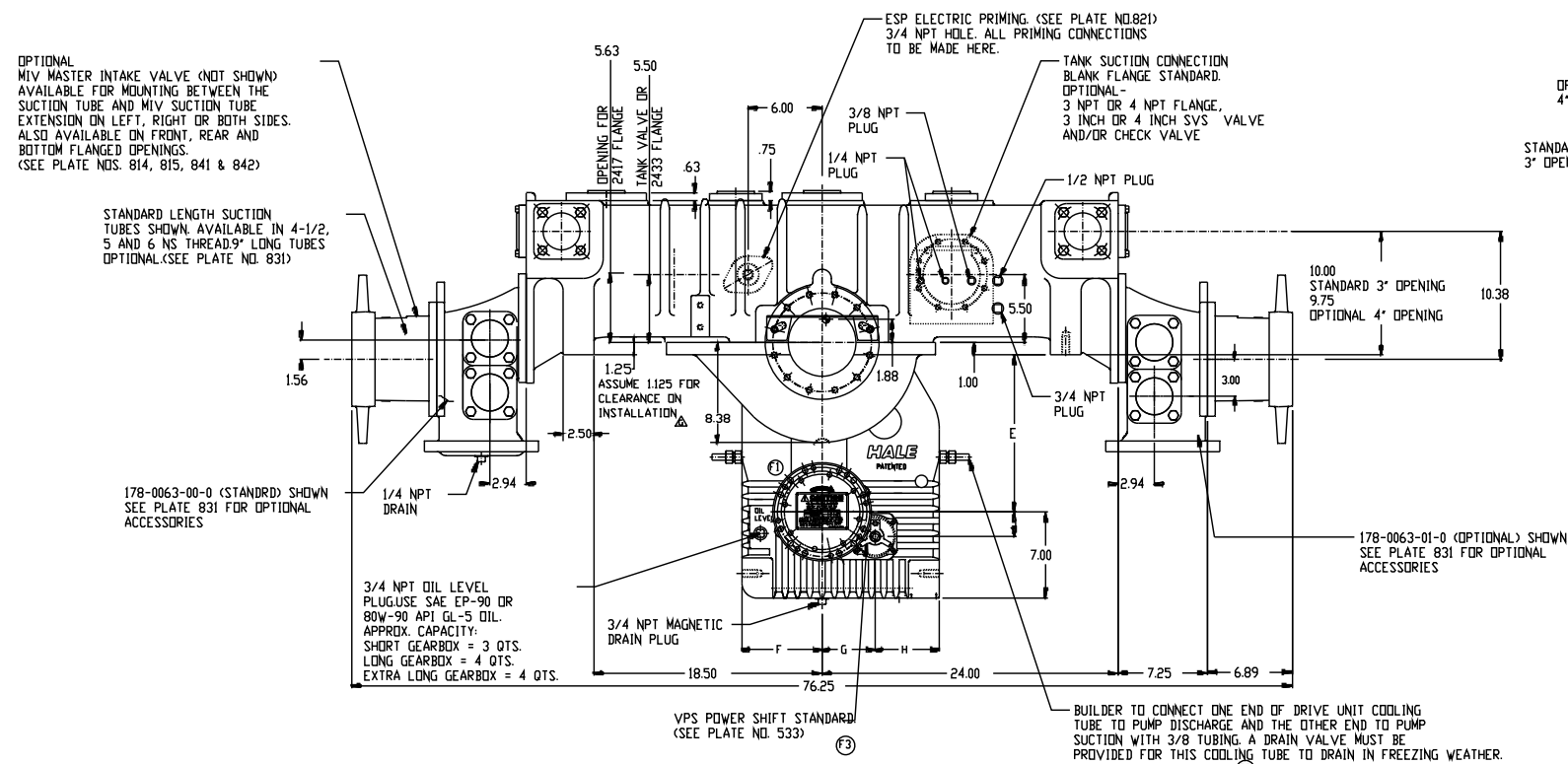
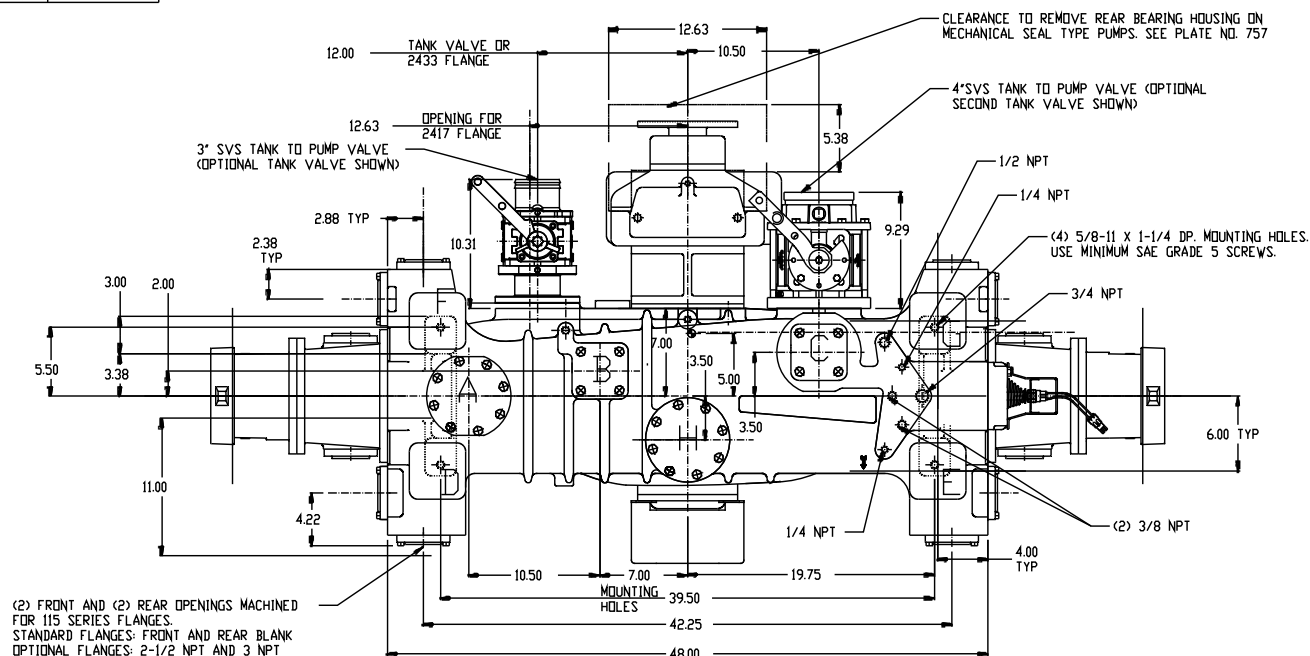


| OPTIONAL DISCHARGE FLANGES |       |                         |                |
|----------------------------|-------|-------------------------|----------------|
| STANDARD                   |       | OPTIONAL                | STD. CAST HOLE |
| A                          | BLANK | 2-1/2, 3 & 4 NPT        | 4              |
| B                          | BLANK | 1-1/4, 2, 2-1/2 & 3 NPT | 3              |
| C                          | BLANK | 2-1/2, 3 & 4 NPT        | 3              |
| D                          | —     | 2-1/2 & 3 NPT           | CAST SOLID     |
| E                          | —     | 2-1/2 & 3 NPT           | CAST SOLID     |
| F                          | —     | 2-1/2 & 3 NPT           | CAST SOLID     |
| G                          | —     | 2-1/2 & 3 NPT           | CAST SOLID     |
| H                          | BLANK | 2-1/2, 3 & 4 NPT        | 3              |

NOTES

1. REFER TO HALE PUMP/ENGINE COMBINATION LIST TO SELECT PROPER RATIO TO MATCH PUMP WITH ENGINE.
2. WEIGHT OF STANDARD QMAX 1500 G.P.M. PUMP AS SHOWN LESS PRIMING PUMP = 1275 LBS.
3.  $\odot$  = CENTER OF GRAVITY.
4. IMPELLER SHAFT SEAL - MECHANICAL SEAL OR PACKING AVAILABLE.
5. APPLY LOCOTITE # 246 HIGH TEMPERATURE THREAD LOCKER OR EQUIVALENT TO SCREW THREADS AND TORQUE SCREWS PER HALE ENGINEERING STANDARD ES018-002.
6. UNLESS OTHERWISE INDICATED FASTENERS ARE GRADE 5 ZINC PLATED STEEL.
7. FOR PUMP COOLING, AN ADDITIONAL 3/8" LINE SHOULD BE INSTALLED BETWEEN THE PUMP DISCHARGE AND BOOSTER TANK.
8. THIS COOLING LINE IS CONTROLLED BY A PANEL MOUNTED CHECK VALVE AND A CHECK VALVE (HALE P/N: 038-1550-00-0 OR EQUIV.) SHOULD BE INSTALLED IN THE BOOSTER TANK END OF THE COOLING LINE.



| PUMP MODEL | GEAR RATIO | GEARBOX TYPE                | DIMENSIONS |      |      |      |      |
|------------|------------|-----------------------------|------------|------|------|------|------|
|            |            |                             | E          | F    | G    | H    | J    |
| QMAX*-28   | 2.83       | EXTRA LONG GEARBOX ONLY (X) | 14.56      | 6.50 | 5.44 | 4.06 | 1.84 |
| QMAX*-25   | 2.55       |                             | 14.75      |      |      |      |      |
| QMAX*-23   | 2.32       |                             | 14.90      |      |      |      |      |
| QMAX*-21   | 2.13       |                             | 15.06      |      |      |      |      |
| QMAX*-19   | 1.96       |                             | 15.25      |      |      |      |      |
| 6 QMAX*-23 | 2.28       | LONG (L)                    | 12.38      | 6.50 | 4.31 | 5.18 | 2.00 |
|            |            | SHORT (S)                   | 10.50      |      |      |      |      |
| QMAX*-21   | 2.05       | LONG (L)                    | 12.56      |      |      |      |      |
|            |            | SHORT (S)                   | 10.68      |      |      |      |      |
| QMAX*-19   | 1.86       | LONG (L)                    | 12.75      |      |      |      |      |
|            |            | SHORT (S)                   | 10.88      |      |      |      |      |
| QMAX*-17   | 1.71       | LONG (L)                    | 12.94      |      |      |      |      |
|            |            | SHORT (S)                   | 11.06      |      |      |      |      |
| QMAX*-15   | 1.58       | LONG (L)                    | 13.13      |      |      |      |      |
|            |            | SHORT (S)                   | 11.25      |      |      |      |      |

|                                                             |                                                                                          |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------|
| * RATED CAPACITY 1000,1250,1500,<br>1750, 2000 AND 2250 GPM | ** THE SHORT (S) GEARBOX IS STANDARD AND WILL<br>BE SUPPLIED UNLESS OTHERWISE SPECIFIED. |
|-------------------------------------------------------------|------------------------------------------------------------------------------------------|

EXAMPLE: THE MODEL NUMBER FOR A 1500 GPM RATED PUMP WITH  
A 2.28 GEAR RATIO AND A SHORT GEARBOX WOULD BE QMAX150-23S.

DRIVE LINE RECOMMENDATIONS

APPARATUS BUILDER SUPPLIED DRIVELINES SHALL BE OF APPROPRIATE SIZE TO MATCH THE CHASSIS AND PUMP REQUIREMENTS WITH INDIVIDUAL JOINT CANCELLATION AND PHASING BEFORE AND AFTER THE PUMP. DRIVE SHAFT BALANCE (INCLUDING YOKES) SHALL NOT EXCEED THE RECOMMENDED LIMIT OF EITHER THE DRIVE SHAFT OR CHASSIS TRANSMISSION MANUFACTURER'S SPECIFICATIONS. DRIVE SHAFT FULL RANGE OPERATING SPEEDS SHALL NOT EXCEED 42% OF ITS CRITICAL SPEED.

## WARNING

EXCEEDING THESE LIMITS OR FAILURE TO FOLLOW THE RECOMMENDATIONS OUTLINED  
IN THIS DRAWING COULD DAMAGE THE GEARBOX AND RESULT IN PERSONAL INJURY.  
QMAX MIDSHIP MAXIMUM PUMP PRESSURE (HYDROSTATIC & HYDRODYNAMIC) = 600 PSI  
2HP HIGH PRESSURE PUMP MAXIMUM PUMP PRESSURE WHERE HYDROSTATIC = 600 PS  
I & HYDRODYNAMIC = 400 PSI. MAXIMUM POWER INPUT FOR PUMPING = 450 HP. MAXIMUM TORQUE  
ON PUMP SHAFT = 2300 LBS-FT. MAXIMUM GEARBOX SHAFT TORQUE (ROAD) = 16,000 LBS-FT

| PUMP MODEL            | QMAX*-23 $\frac{1}{2}$ | QMAX*-21 $\frac{1}{2}$ | QMAX*-19 $\frac{1}{2}$ | QMAX*-17 $\frac{1}{2}$ | QMAX*-15 $\frac{1}{2}$ |
|-----------------------|------------------------|------------------------|------------------------|------------------------|------------------------|
| MAX GEARBOX INPUT RPM | 2280                   | 2530                   | 2780                   | 3030                   | 3280                   |
| PUMP MODEL            | QMAX*-28X              | QMAX*-25X              | QMAX*-23X              | QMAX*-21X              | QMAX*-19X              |
| MAX GEARBOX INPUT RPM | 1840                   | 2040                   | 2230                   | 2430                   | 2650                   |

OPTIONAL HP AND 2HP SERIES PUMPS  
SEE PLATE NOS. 704 AND 705.  
AVAILABLE ON LONG GEARBOX AND  
EXTRA LONG GEARBOX ONLY.

OPTIONAL - ESP PRIMING PUMP CAN  
BE MOUNTED ON GEAR BOX.  
NOT AVAILABLE IF HP OR 2HP IS USED.

STANDARD FLANGES  
THE HALF COMBINATION FLANGES ARE  
SIZED FOR SPICER 1600, 1700 AND 1800  
SERIES FLANGES.  
1600 SERIES WITH 6-5/8 DIA FEMALE PILOT,  
USE (8) 3/8 DIA SAE GRADE 8 SCREWS.  
1700 SERIES WITH 7-3/4 DIA FEMALE PILOT,  
USE (8) 3/8 DIA SAE GRADE 8 SCREWS.  
1800 SERIES WITH 7-3/4 DIA FEMALE PILOT,  
USE (12) 7/16 DIA SAE GRADE 8 SCREWS.

|        |     |                                  |     |          |      |        |     |                               |     |          |      |                                                                                                                                                                          |
|--------|-----|----------------------------------|-----|----------|------|--------|-----|-------------------------------|-----|----------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ECD NO | REV | CHANGED FROM                     | BY  | DATE     | APVD | ECD NO | REV | CHANGED FROM                  | BY  | DATE     | APVD | <br>HALE PRODUCTS, INC.<br>A Unit of IDEX Corporation<br>Conshohocken, PA 19428 USA |
| 1110   | F1  | SPRING CROSS SECTION ELIMINATED  | CIG | 1-24-12  | JRP  | 99-121 | B   | UPDATE DRAWING                | DJL | 6-15-99  | RET  |                                                                                                                                                                          |
| 1110   | F2  | COOLANT TUBE PLUMBING NOTED      | CIG | 1-24-12  | JRP  | 00-441 | C   | UPDATE DRAWING                | DJL | 4-10-00  | MAL  |                                                                                                                                                                          |
| 1110   | F3  | VP3 UNIT CHANGED TO STANDARD CTG | CIG | 1-24-12  | JRP  | 0303   | D   | UPDATED TO CURRENT PRODUCTION | DSH | 01-25-06 | RET  |                                                                                                                                                                          |
| 4868   | G   | ADDED MOUNTING PAD INSTAL SW     | DMB | 08-12-19 | JS2  | 1040   | E   | DIMENSION CHANGE              | DRS | 12-7-10  | PRV  |                                                                                                                                                                          |

MAY NOT BE REPRODUCED OR USED TO MAKE OTHER DRAWINGS OR MACHINERY.

DATE 2-16-98 **PRV** SCALE: 20