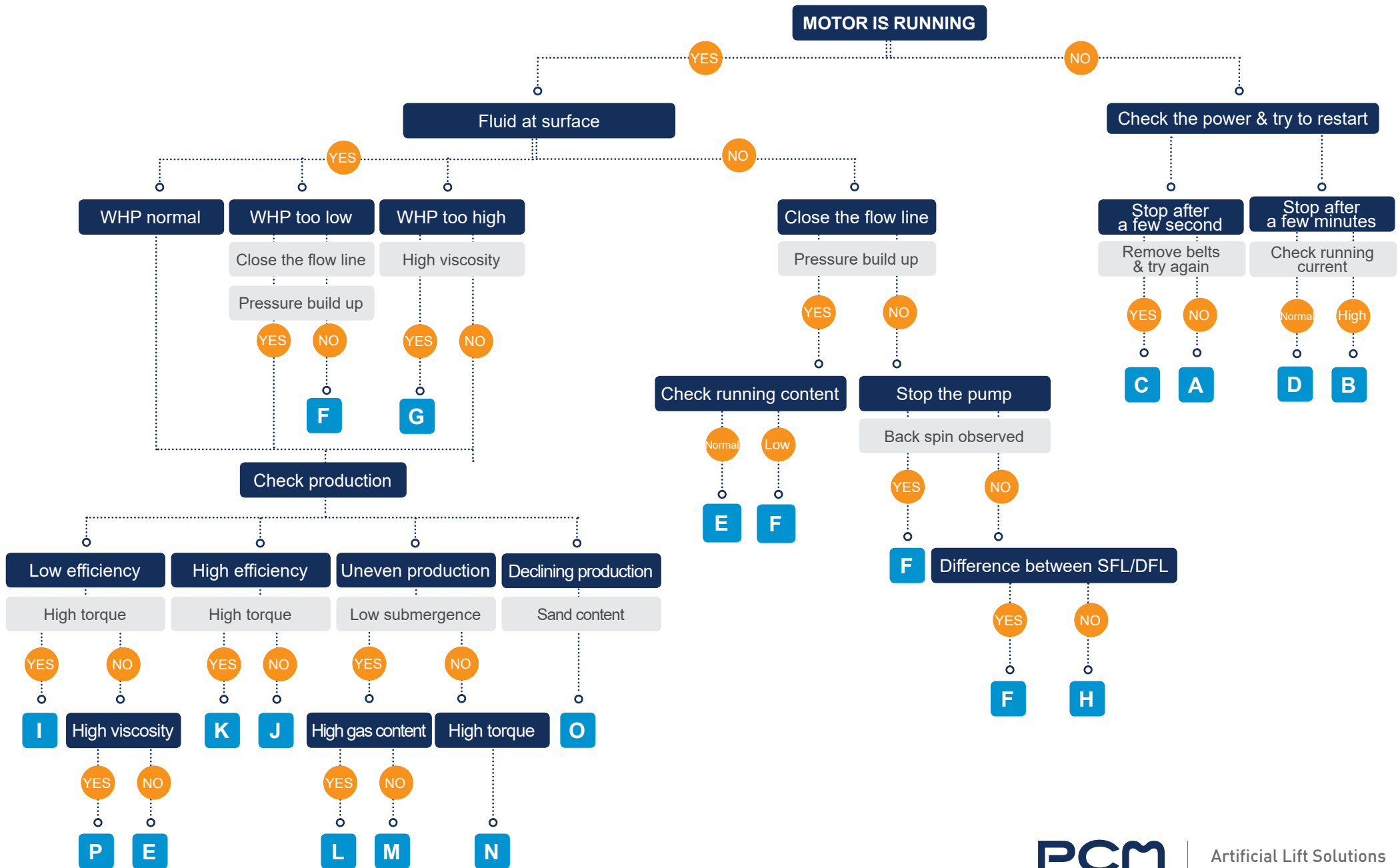


TROUBLESHOOTING GUIDE

Use the below troubleshooting tree to identify the most probable cause and find the possible remedies. Analyze also monitoring data & past events of the well to get better understanding of possible problems.

keep it moving 



CAUSES

| | Possible causes | Without workover | With flush by unit | With workover rig |
|----------|--|------------------|--------------------|-------------------|
| A | Motor and/or VSD problem | 1 | - | - |
| B | Elastomer swelling / Rotor spaced out too low / Wrong rotor sizing | - | 7 | 10/13/14 |
| C | Rod string stuck / Excessive swollen / Wrong space out / Well head rams closed / Sand accumulation above the pump / Drivehead bearing problems | 2 | 7/8 | 10/13/14/17 |
| D | Check pressure switch / Wrong VSD settings or active interlocks | 1 | - | - |
| E | Pump worn out / Space out too high / High GVF | - | - | 10/13/14 |
| F | Hole in tubing / Tubing drain blown out | - | - | 18/19 |
| G | High flow loss on line due to viscosity | 6/7 | - | - |
| H | Parted rod string | - | 9 | - |
| I | Wrong space out, pump obstructed (plug) / High viscosity / Pump overloaded | 3/5/6 | 7/8 | 11/16 |
| J | Normal operation | - | - | - |
| K | Rotor sizing too tighten / Elastomer swollen / Products with high viscosity | 3/5/6 | 8 | 11/13/14/16 |
| L | High GVF / Not enough inflow at pump | 4/5 | - | 12/15 |
| M | Well bore inflow fluctuating / Wrong rotor sizing | 4/6 | - | 14 |
| N | Solids slugs / Rotor spaced out too low / Pump overloaded | 3/5/6 | 7/8 | 11/16 |
| O | Pump abrasion | 5 | - | 17 |
| P | Pump cavity filling issue due to rotor speed vs fluid viscosity | 5/6 | - | 12 |

REMEDIES

| Without workovers |
|--|
| 1- Check electrical conformity 2- Check that the well head arms are opened 3- Reduce well head pressure 4- Reduce speed 5- Inject chemicals 6- Review flow line |

| With flush by unit |
|---|
| 7- Re-evaluate space out procedure 8- Flush the pump 9- Pull out the rotor, inspect it and replace it if applicable |

| With workover rig |
|---|
| 10- Pull out the pump and replace it if necessary 11- Change for a higherhead capacity pump 12- Change for a higher pump capacity then lower speed 13- Re-evaluate elastomer choice 14- Re-evaluate rotor sizing 15- Lower the pump setting depth 16- Increase tubing size 17- Install sand management devices 18- Replace the worn joint of tuning 19- Check the tubing drain |