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Auto-start time

S M Kumar**Process Design Consultant****Top Contributor**[Unfollow S M](#)

Query: I have a query about operation time needs to come into service auto-start stand-by pump. How fast is such a pump? keeping in mind that for upstream pump suction vessel the time between normal liquid level up to high high liquid level may not be very long (can be less than 10 minutes in most of the cases) and so the auto-start stand-by pump should come to service as soon as possible. So how fast is(or should be) auto-start pump?

Response: I will pass this one to other members to respond

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Comments

9 comments



sheila

sheila jahanlou**Principal process engineer at Nargan Engineers & Constructors**

Dear Mr. Kumar

First of all thanks for your query. As you know there is a Flow (or Pressure) transmitter on the common header of discharge line of pumps which stop the running pump and start spare pump with FSLL (or PSHH). In the current project which i am working there is a note with this description " FSLL will stop the running pump and start automatically the spare pump.If after 10 seconds flow rate is still low, Fsl will trip both pumps".You see that 10 sec. is very low available time respect to 10 mintues. In actual operation there are many causes for malfunction like pump or transmitter malfunction or rupture of discharge pipe. It seems this time shall be defined base on the major malfunction which effects on downstream process.

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Mojtaba

Mojtaba Habibi**Process Engineer at Petroleum Engineering and Development Company (PEDEC)****Top Contributor**

As far as I know when talking about auto-start requirement for stand-by equipment such as pump the auto-start time should be as short as possible and is typically less than one minute.

For suto-start stand-by equipment we do not necessarily need FSLL or PSHH at main discharge header. For pump this can be done via MCC.

This time delay (for example 10 seconds which is mentioned by Ms.Jahanlou) has nothing to do with auto-start time. On the other hand it seems there have been some concerns regarding to discharge header rupture and because of that, designer has considered this time delay and subsequent pump shutdown.

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sheila

sheila jahanlou**Principal process engineer at Nargan Engineers & Constructors**

Dear Mojtaba Habibi

I am not agree with your concern. FSLL and PSHH (or PSHH) are process requirments due to auto start of spare pump and stop current pumps. In fact an interlock is activated by FSLL and PSHH (or PSHH) which has action on MCC by interposing relay for auto starting. In the other hand 10 seconds which i mentioned can be for any malfunction . below you can find some of them:

- 1- current pump destroy
- 2- Flow or pressure transmitter destroy
- 3- Rupture of pump discharge line

in case1 and 3, flow will be decreased actually. The point which i want to emphasis is that time of auto start pump is depended to necessary time due to downstream can continuous its normal operation in the case of above mentioned malfunction. The last point is that MCC can only show the status of pump (on or off) and MCC can be activated by an interlock or manually hand switch.

3-
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S M Kumar
Process Design Consultant
Top Contributor

S M

I have received a few direct mails and would like to point out following.

We always have layers of protection – (1) controls & alarms PCV/FCV/ PAH/LAH (2) trips PAHH/PALL/FSL and (3) Mechanical device like a PSV.

Control inputs like PIC/PAH/PAL or LIC/LAL/LAH go to a separate system. Trips get wired to a separate SIS system. These system are in 2 separate layers and do not talk to each other to avoid common mode failure. Hence trips such as PSL or FSL are not used for control function such as start a spare pump. Yes, they can be used to trip pump(s).

Standby pumps are generally auto-started

- (1) by a fall in discharge pressure or flow as deducted by a PAL/FAL (PAL/FAL, being alarm/control function goes to the control wiring). If the pump's head curve is flat, you go for flow transmitter; otherwise pressure transmitter which is cheap
- (2) by a fall in line current of Duty Pump's motor
- (3) by a rise in level of source vessel from where liquid is intermittently pumped (LAH1 start Duty pump; if level still continues to rise, LAH2 start Standby pump; LAL1 trip Standby Pump; LAL2 trip Duty Pump)
- (4) Failure to start the Duty Pump as reported by fault signal to MCC may trigger Standby Pump to start

Sheila: The PID not you refer "FSL will stop the running pump and start automatically the spare pump". FSL tripping a pump is OK; but starting a pump is a control action and not an SIS function to which FSL is wired. I am not sure if the note is right.

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👍 [Mojtaba Habibi](#) likes this



Mojtaba Habibi
Process Engineer at Petroleum Engineering and Development Company (PEDEC)
Top Contributor

Mojtaba

Dear Mr.Kumar,

I support the option 4 to auto start the stand by pump because for option like PAL or FAL there is a concern for spurious shutdown of the pump due to fault or failure of the transmitter and this is highly important concern for auto-start pumps that most of the time should be available during plant operation.

How about auto-start time as the main question of this topic?

Best,
Mojtaba

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S M Kumar
Process Design Consultant
Top Contributor

S M

Dear Mojtaba: That is your view. Others may prefer PAL or FAL; this is not leading spurious shutdown but start-up of the standby pump. Operator can always shut it down after deciding on the situation. Option 4 is less common. Auto-start time muse be few minutes. I don't recall. That's why posted it here for others to comment. Kumar

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Mojtaba Habibi

Process Engineer at Petroleum Engineering and Development Company (PEDEC)
Top Contributor

Mojtaba

Dear Mr.Kumar,

Different engineering view points is very usual and I am always willing to know other ideas that can improve my thoughts and design configurations.

About auto-stop spurious shutdown concern due to flow (or pressure) transmitter fault or failure:

In my view this does not matter if standby pump is started automatically after shutdown of duty pump because if something is wrong with flow (or pressure) transmitter and not duty pump itself then after a short time standby pump also will be tripped as well.

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sheila

sheila jahanlou

Principal process engineer at Nargan Engineers & Constructors

Dear Mr. Kumar

Sorry for delay reply. In fact i was too busy in my job and i preferred after a negotiation with my instrument colleagues we continous our disscusion. This note " FSLI will stop the running pump and start automatically the spare pump.If after 10 seconds flow rate is still low, FslI will trip both pumps" is correct and i see various licensors in my current projects (gas refinery) used it with different times such as 10, 30, 40 and etc. In this project we have three levels of shut down. the lowest level is level 3 (SD3) which is equipment shut down like pump trip. In Instrument control & safeguarding philosophy there are some facilities which SD3 can be defiend in DCS (control system). Below you can find some paragraph which has been extracted from Instrument control & safeguarding philosophy document:

* SD3 functions may be implemented on DCS controllers or on package PLC with redundant configuration such as to meet required availability / reliability

* Physical separation between SD3 and PCS (process control system) devices within DCS is not required.

Therefore we can conclude that FSLI can trip the current pump and start the spare pump.

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S M

S M Kumar

Process Design Consultant
Top Contributor

Thanks Sheila for the info. Kumar

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