FAILURE CODE FC1

Worn wearing ring

Algorithm

Step 1: START

Step 2: INPUT

SET VALUES: Q, P_d, i, λ, η, E_s, CV

MEASURED VALUES: Q1, P_d1, i1, λ1, η1, E_s1, CV1

Step 3: IF(Q1 ≤ 54.8) AND (P_d1 ≤ 47) AND (i1 ≥18) AND (η1 ≤ 53) AND (λ1≥ 4.5) AND(E_s1≥ 2.5) AND (CV1≥45%) then

SUM = ABS[(Q-Q1)/Q + (P_d-P_d1)/P_d + (i-i1)/i + (λ-λ1)/λ + (η-η1)/η + (E_s-E_s1)/E_s + (CV-CV1)/CV]

AVG = SUM / 7

ELSE

GO TO Step 7

ENDIF

Step 4: IF(AVG>0)AND(AVG<0.8679) then

PRINT GREEN

Stop

ENDIF

Step 5: IF(AVG>=0.8679)AND(AVG<1.1731) then

PRINT YELLOW

Stop

ENDIF

Step 6: IF(AVG>=1.1731) then

PRINT RED

ELSE

GO TO Step 4

ENDIF

Step 7: STOP

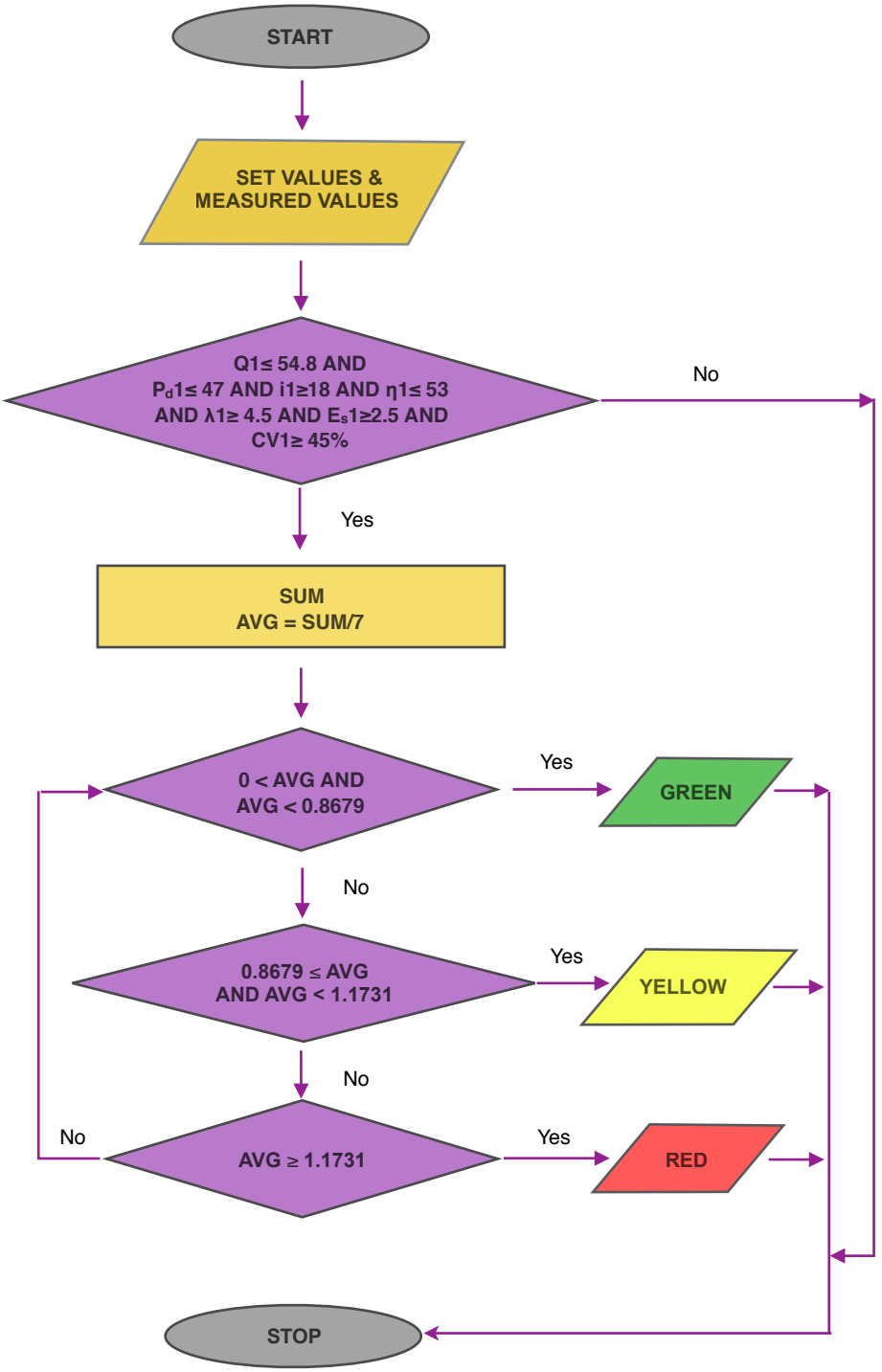

Fig. Flowchart for Failure Code FC1

FAILURE CODE FC2

Worn, rusted, defective bearing

Algorithm

Step 1: START

Step 2: INPUT

SET VALUES: i, λ, E_s, T_B

MEASURED VALUES: i1, λ1, E_s1, T_B1

Step 3: IF(i1≥18) AND (λ1≥4.5) AND(E_s1≥2.5) AND (T_B1≥80) then

SUM =ABS[(i-i1)/i + (λ-λ1)/λ + (E_s-E_s1)/E_s + (T_B-T_B1)/T_B]

AVG = SUM / 4

ELSE

GO TO Step 7

ENDIF

Step 4: IF(AVG>0)AND(AVG<1.2022) then

PRINT GREEN

Stop

ENDIF

Step 5: IF(AVG>=1.2022)AND(AVG<1.5116) then

PRINT YELLOW

Stop

ENDIF

Step 6: IF(AVG>=1.5116) then

PRINT RED

ELSE

GO TO Step 4

ENDIF

Step 7: STOP

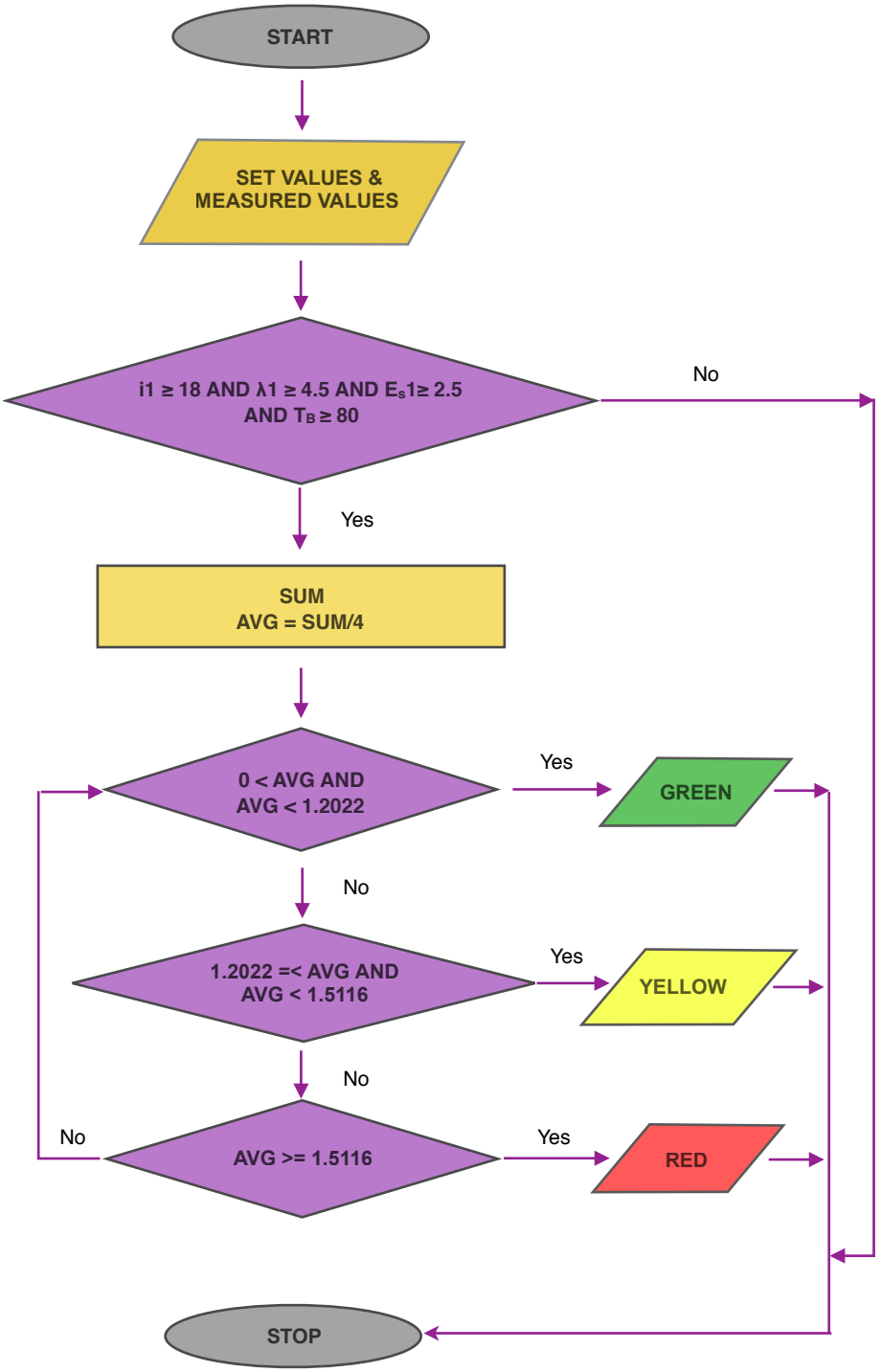

Fig. Flowchart for Failure Code FC2

FAILURE CODE FC3

Starvation at Pump suction/Insufficient suction volume

Algorithm

Step 1: START

Step 2: INPUT

SET VALUES: Q, P_d, i, λ, E_s, T_P, T_B, CV

MEASURED VALUES: Q1, P_d1, i1, λ1, E_s1, T_P1, T_B1, CV1

Step 3: IF(Q1 ≤ 54.8) AND (P_d1 ≤ 47) AND (i1 ≤ 15) AND (λ1 ≥ 4.5) AND(E_s1 ≥ 2.5) AND (T_P1 ≥ 300) AND (T_B1 ≥ 80) AND (CV1 ≥ 45%) then

SUM = ABS[(Q-Q1)/Q + (P_d-P_d1)/P_d + (i-i1)/i + (λ-λ1)/λ + (E_s-E_s1)/E_s + (T_P-T_P1)/T_P + (T_B-T_B1)/T_B + (CV-CV1)/CV]

AVG = SUM / 8

ELSE

GO TO Step 7

ENDIF

Step 4: IF(AVG>0)AND(AVG<0.7781) then

PRINT GREEN

Stop

ENDIF

Step 5: IF(AVG>=0.7781)AND(AVG<1.0317) then

PRINT YELLOW

Stop

ENDIF

Step 6: IF(AVG>=1.5116) then

PRINT RED

ELSE

GO TO Step 4

ENDIF

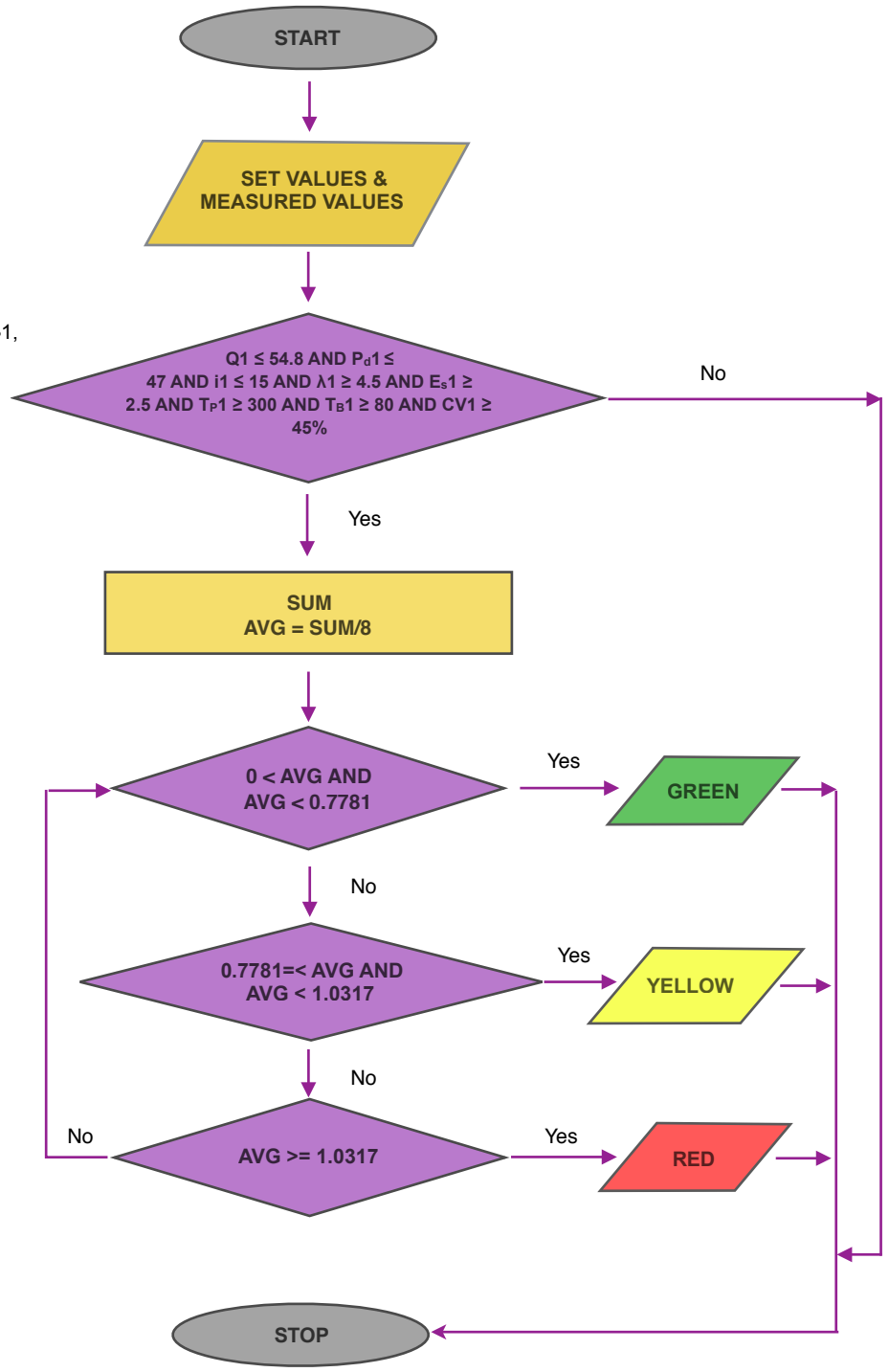

Fig. Flowchart for Failure Code FC3

FAILURE CODE FC4

Internal rubbing

Algorithm

Step 1: START

Step 2: INPUT

SET VALUES: i, λ, E_s, T_P,

MEASURED VALUES: i1, λ1, E_s1, T_P1

Step 3: IF(i1 ≥ 18) AND (λ1 ≥ 4.5) AND (E_s1 ≥ 2.5) AND (T_P1 ≥ 300) then

SUM = ABS [(i-i1)/i + (λ-λ1)/λ + (E_s-E_s1)/E_s + (T_P -T_P1)/T_P]

AVG = SUM / 4

ELSE

GO TO Step 7

ENDIF

Step 4: IF(AVG>0)AND(AVG<1.2050) then

PRINT GREEN

Stop

ENDIF

Step 5: IF(AVG>=1.2050)AND(AVG<1.4978) then

PRINT YELLOW

Stop

ENDIF

Step 6: IF(AVG>=1.5116) then

PRINT RED

ELSE

GO TO Step 4

ENDIF

Step 7: STOP

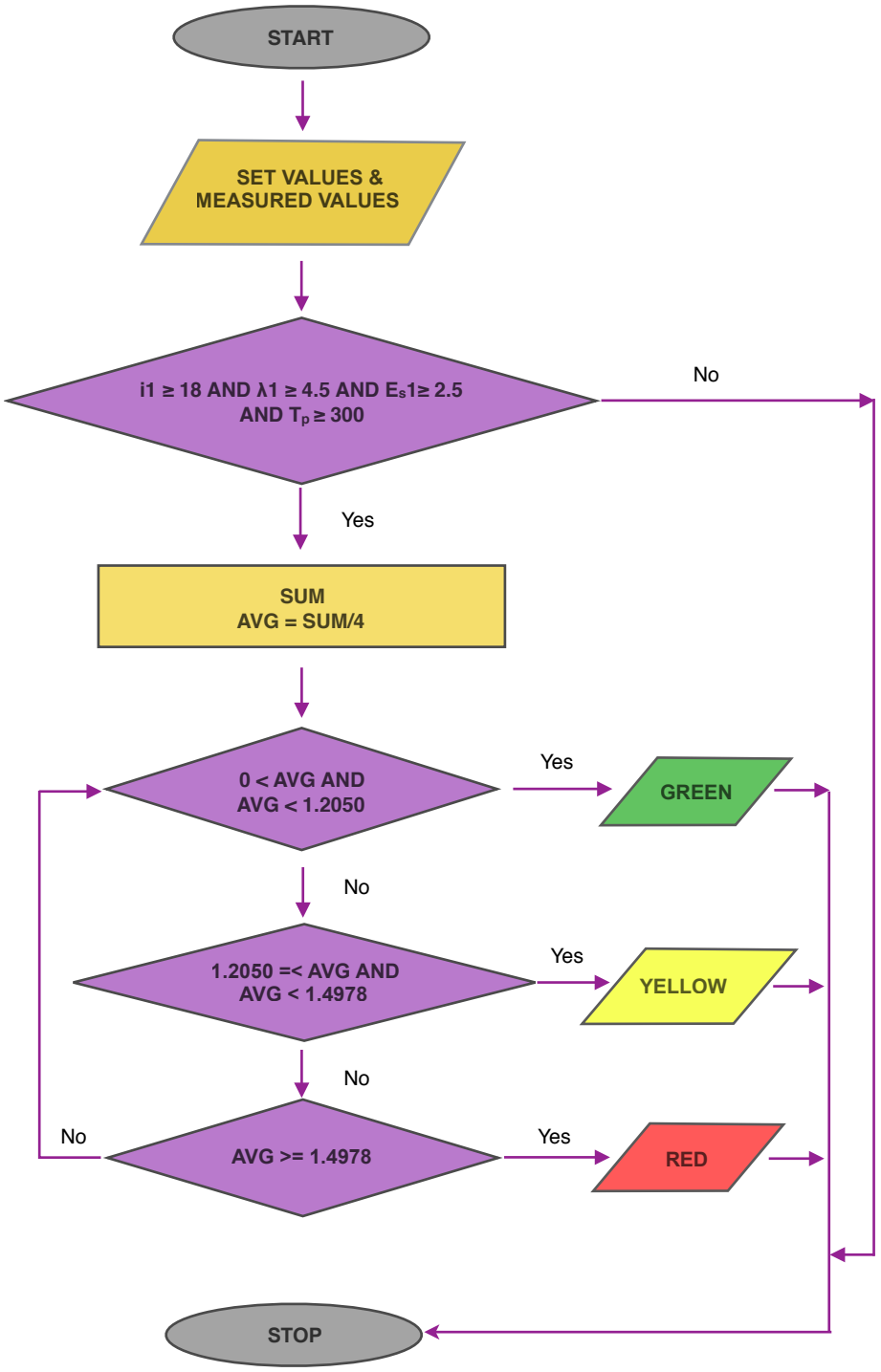

Fig. Flowchart for Failure Code FC4